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PIT AND QUARRY

JULY 1948

View in Lone Star Cement Corporation's New Packing Plant at Birmingham, Ala. (see page 79).

In this Issue

Riverside's Oro Grande Plant • Report on Japanese Cemen Industry • Flame Photometry • Ideal Progress Report • Norwa Cement Plants • Natl. Industrial Sand Assn. Conventio

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Mr. Edward H. Frazee, president of Intercity Quarries, is sold on the New Holland Model 3030 Double Impeller Breaker and the quality product delivered by Dual Impact Action. He says, "Bottlenecks in crushing were over for us the day we installed our New Holland 3030 Breaker . . . we have given up the idea of trying to feed this machine to capacity. The City Engineers of Kansas City have declared this stone superior to other stone crushed here and have awarded us contracts on this basis. You can identify this stone immediately. No slivers, flat discs or odd shapes, nothing but cubical in the six sizes of commercial stone we make.

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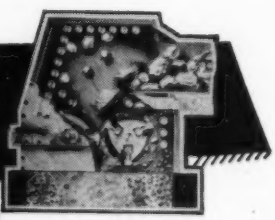

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Vol. 41 JULY 1948 No. 1

PIT AND QUARRY

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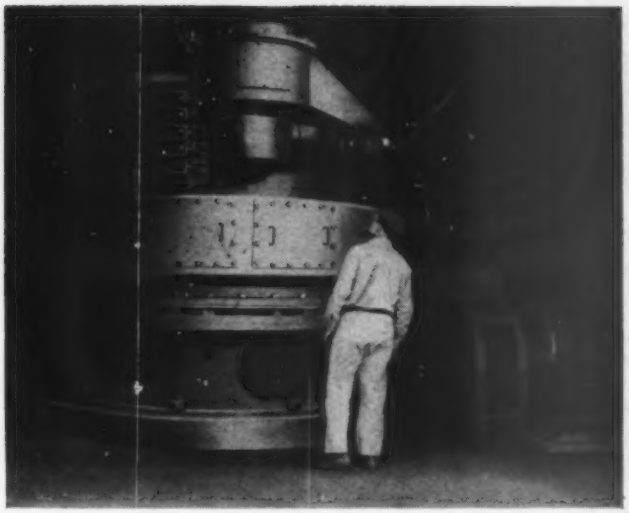

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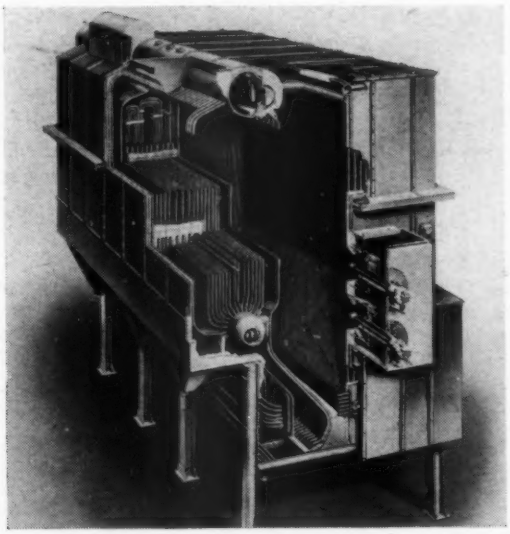

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editorial

Soil Conservation

AS nearly everyone knows by now one of the last acts of the 80th Congress before adjourning was the passage of a long-range farm bill. This bill extends the Agricultural Conservation Program for two years, appropriating $150,000,000 for the calendar year 1948, and $262,500,000 for 1949, for soil conservation payments. It provides for a continuation of present price supports, with minor changes, during 1949, and for long-range support, including the new parity formula, beginning in 1950. While it is a compromise bill leaving much to be desired it at least insures the continuation of price supports which would otherwise have expired on December 31, 1948.

Much of the credit for the present attitude on soil conservation in Congress is due the two associations of agricultural limestone producers, the Agricultural Limestone Institute, division of the National Crushed Stone Assn. (formerly the Agricultural Limestone Division of the N. C. S. A.), and the National Agricultural Limestone Assn., Inc., their staffs and producer heads, and their members. Thoroughly convinced that the use of agstone is vital to the future prosperity of this country and the health of its people, these two groups have tried in every possible way to put the facts before the public. At their various meetings and in their releases to members they have brought forth a steady stream of facts and evidence which these members were urged to put before the farmers and general public in their areas, and particularly before their representatives in Congress. They have cooperated with the various state agricultural colleges by giving publicity to their findings and by supporting them in their work. Their representatives have talked to individual congressmen and have ably presented the facts before congressional committees.

Partly as a result of these efforts much progress has been made as these latest developments prove. There is no doubt that the general public is becoming increasingly aware of the vital necessity for conservation of the soil, our most important natural resource. Articles on this subject in widely-read general magazines and in newspapers have helped to arouse the public consciousness. This educational program must be continued and amplified. One of the best means of doing this is a powerful new 16-mm. movie short in colors, "The Other Side of the Fence," recently brought out by the Phillips Petroleum Co., and available at cost to any interested parties. Both agstone associations are now offering this movie for sale to their members at cost, or for rental at a moderate fee.

Strange as it may seem there remains much work to be done in convincing farmers that intelligent soil conservation practices pay direct benefits to them, whether they own and operate their own farms, or operate them on some form of rental agreement. They receive the biggest direct benefits from the application of agstone and other conservation practices and yet an unbelievably large percentage of farmers are indifferent on the subject. Many of them accept these practices only because they are almost entirely paid for from public funds, others refuse to accept them even if offered free of charge. Proof of this lethargic attitude among some farmers was the sharp falling off in the demand for agstone early in 1948 when ACP appropriations were reduced. Needless to say the present educational work among farmers must be continued and expanded.

The gratifying progress that has been made to date in promoting education on the need for soil conservation has resulted from the unselfish efforts of many, including the members of the two national agstone associations and the various state and regional associations. As is usually the case in any effort benefiting humanity in general some carry the load, while others, with just as much at stake, sit idly by. The memberships of the various agstone associations undoubtedly represent well over half the productive capacity of the industry. In numbers, however, the picture is different as there are hundreds of producers who have no such affiliations and are not participating in any way in this educational program.

We are not attempting to urge any producer of agricultural limestone to join one of these associations, although we are sure he would benefit from it in many ways. We merely suggest that each producer investigate this subject for himself and make his decision only after studying the facts. We do feel very strongly, however, that, whether or not a producer joins one of these groups, he is shirking his moral responsibility to the present and future generations if he does not in some way help to disseminate the facts about soil conservation. Not to mention the fact that the future of his business depends to a large extent on his efforts in this direction.

The 80th Congress

THE 80th Congress of these United States adjourned recently in a flurry of activity during which many of the economies that had been so carefully planned were nullified. The expansion of the national defense program was the main reason why no net reduction in the budget was achieved. In spite of this, experts now look for a surplus of nearly 5 billions in 1948 and of a somewhat greater sum in 1949.

Of the many new laws enacted perhaps the two of most direct importance to all producers of non-metallic minerals were the Taft-Hartley Labor-Management Relations Act which put business approximately back on a level with labor in bargaining power, and the Portal-to-Portal Pay Act which restricts claims for pay from the time a worker reaches his place of work until he leaves it. Producers of agricultural limestone were given a new lease on life by the extension of the Agricultural Conservation Program and the extension of the federal aid highways appropriations will benefit producers of cement and aggregates. Of direct financial benefit to industry were the reduction in the income tax and the maintenance of social security on its present basis. Even greater potential savings, however, were made possible by the setting up of a special commission to eliminate overlapping functions and effect consolidations in government bureaus. The authorization of a census of business and manufactures every five years is another forward step.

Walter E. Trauffer

news of the industry

PIT AND QUARRY

Agricultural Limestone Div. Becomes Institute by Vote Of Board of Directors

The annual mid-year meeting of the board of directors of the Agricultural Limestone Division of the National Crushed Stone Assn. was held at the Edgewater Beach Hotel, Chicago, Ill., on Friday, June 4. Horace C. Krause, chairman, presided at the meeting, which was attended by a record number of board members. After the usual routine matters were disposed of, several important decisions were made. It was voted to change the name of this organization to the "Agricultural Limestone Institute, a Division of the National Crushed Stone Assn.," subject to the approval of the N. C. S. A. board. It was also decided that the 1949 convention at the New Yorker Hotel, New York, is to start at 10:00 a.m. on Monday February 21 and run through Tuesday, February 22. The banquet is to be held Monday night, and the directors will meet at 2:30 p.m. on Sunday, February 20. The 1949 mid-year directors' meeting will be held at the Mayflower Hotel, Washington, D. C., on June 10, 1949.

The possibility of qualifying the industry for percentage depletion was again discussed, and it was agreed that personal contact by producers with their congressmen was necessary to sell the idea. It was pointed out that the agricultural limestone industry is as much entitled to percentage depletion as most of the industries which have already qualified for it.

There was also some discussion of the growing competition in some areas from marl, caliche and slag. Mr. Krause suggested that the best way to meet this competition is for producers to see that the agstone they sell is up to standard and is used to the best advantage.

Consideration was also given to the matter of contributing financially to a new semi-technical magazine for the promotion of good agricultural practices which the American Society of Agronomy proposes to publish. Individual producers are invited to contribute.

One of the features of this meeting was the showing of the Phillips Petroleum Company's excellent talking moving picture showing the tragic results of soil depletion. Dr. Wm. A. Albrecht does a professional job as principal actor and narrator in this film. The Institute has ordered a number of copies of the movie which it will sell or rent to its members for showings in their market areas.

Ernest M. Green, president of the Ohio Turnpike Committee, disclosed that the next session of the Ohio General Assembly will be asked to pass enabling legislation to permit construction of self-supporting super-highways.

Coming Events

July 8, 1948—Hot Springs. Directors' meeting, National Crushed Stone Association, The Homestead.

July 16, 1948—Chicago. Directors' Meeting, National Agricultural Limestone Assn., Inc., Hotel Bismarck.

July 16-24, 1948—Chicago. Annual convention and road show, American Road Builders' Association, Soldier Field.

July 21-23, 1948—Seattle. Summer convention, American Society of Civil Engineers, Olympic Hotel.

September 20, 1948—Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor.

September 22, 1948—Colorado Springs. Directors' meeting, National Sand and Gravel Association, The Broadmoor.

October 12-16, 1948 — Chicago. Fifth National Chemical Exposition and National Industrial Chemical Conference, Coliseum and Coliseum Annex.

October 18-22, 1948—Chicago. Thirty-sixth National Safety Congress and Exposition, Stevens Hotel.

October 20-22, 1948—White Sulphur Springs, W. Va. Fall meeting, National Industrial Sand Association, The Greenbrier.

Marquette Files Petition With Supreme Court for Cement Case Rehearing

Edward A. Zimmerman of Zimmerman and Norman, Chicago attorneys, has filed with the U. S. Supreme Court a petition for reconsideration and rehearing of the "Cement Case" in behalf of the Marquette Cement Manufacturing Company.

The petition contends that the Supreme Court has failed to give sufficient consideration to the respondents' argument before the Court that the Federal Trade Commission has grossly exceeded its authority in assuming jurisdiction and prosecuting a case charging a violation of the Sherman Antitrust Act. Citing again 40 pages from the Congressional Record of 1914, when the Act was passed, the petition stresses that "the opinion (in the cement case) has construed the Trade Commission Act directly contrary to the clear intent and purpose of the Act."

The petition further charges that unless the Supreme Court alters its opinion in this case "the Trade Commission could, at any time, institute, and proceed in, labor cases without any regard to the limitations of Section 6 of the Clayton Act or of the Norris-LaGuardia Act. Thus without an act of Congress, but by judicial legislation . . . the power of the Trade Commission would be extended to labor disputes."

It is expected that the Supreme Court will consider this petition early this month, as well as those petitions for rehearing filed by other cement companies since the Court's opinion in this case was handed down on April 26, 1948.

Mrs. Roma Turpen Resigns From Duties on N.L.A. Staff

The National Lime Association staff has announced the resignation of Mrs. Roma Medford Turpen, who has been presiding Sec. Treas. of the organization for the last 19 years. Her resignation became effective on June 30.

After having served the N.L.A. most capably for nearly two decades, Mrs. Turpen will devote her entire time to her family and home.

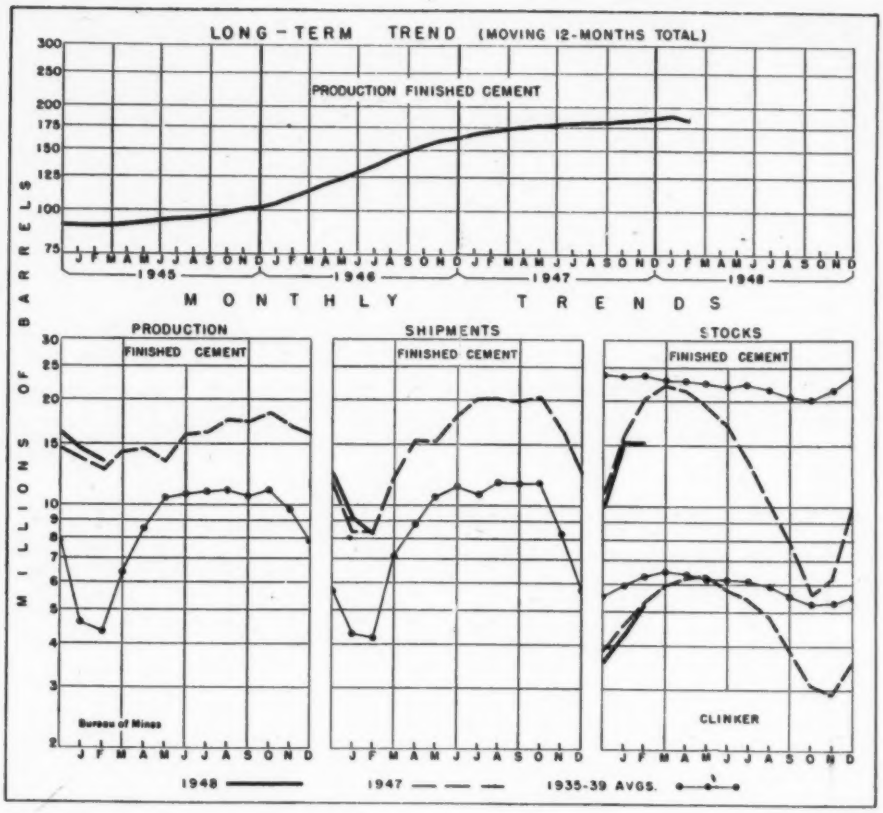
Lehigh Announces Plans For New Cement Plant on 9500-Acre Florida Site

The Lehigh Portland Cement Company, one of the largest cement manufacturers in the country, has recently purchased approximately 9,500 acres of property just north of Flagler Beach, Fla., and is contemplating the construction of a large cement plant at that site. After two years of exhaustive exploration along the East Coast, the company discovered at this location what is said to be the most extensive deposit of coquina shells ever found in this country. The shells are massed in three parallel ridges, each six miles long, from 800 to 1000 feet wide, and approximately 50 feet deep. The property abuts the Florida Intracoastal Canal throughout its length and is situated about six miles east of the main line of the Florida East Coast Railroad at Bunnell.

The coquina shells, which are rich in calcium carbonate, will, when mixed with low silica clays, be the raw material for portland cement. In addition to the lime-bearing materials at the Flagler Beach location, the company about 20 years ago purchased more than 1,800 acres of limestone and clay properties north of Ocala in Marion County. These deposits contain some of the finest cement-making materials in the state. Moreover, the company has within the past two months located and purchased extensive kaolin deposits in Georgia, which may be used to supplement the clays obtainable on the company properties in both Marion and Flagler counties. Accordingly, with two ample sources of supply for calcium carbonate and with three nearby deposits of argillaceous material, Lehigh is now said to have under its control the largest quantities of cement-making materials in this section of the country.

Because the company's plans are predicated upon the use of low-cost water transportation, as well as movement of materials by rail, the plant will probably be built directly on the Intracoastal Waterway and will be reached by a spur track from Bunnell. However, because of the tremendous size and weight of cement mill machinery and equipment, exhaustive borings must be made to determine soil-bearing values before a final building site can be selected. Lehigh also has negotiated the purchase from the Atlantic Coast Line of 5½ acres of dock property in Jacksonville along the St. John's River. At this location the company is contemplating the erection of cement silos and a packhouse, from which its products can be promptly shipped to any point within a reasonable radius of the city.

Lehigh Portland Cement Co., having been in business for 50 years, has had a wealth of experience in the manufacture of cement. With 13 plants located at strategic points in 10 different states, it sells cement throughout most of the country. Florida markets have for many years been supplied from its Birmingham, Ala., plant, which is one of the largest and most efficient units in the South.



Production of 13,347,000 barrels of cement in February, 1948, as reported to the U. S. Bureau of Mines, was 6 percent above that reported for February, 1947. Seventy percent of capacity was utilized, an increase of 2 percent over that reported for February, 1947. Mill shipments reached 8,338 barrels in February, 1948, a decrease of 1 percent from that reported in February of the previous year. Stocks of 20,345,000 barrels on February 29, 1948, were 1 percent above those reported for February, 1947. Clinker output in February 1948, reached 14,444,000 barrels, an increase of 7 percent over that reported for February, 1947.

Demand for cement in February, 1948, as indicated by mill shipments, is still above the 1935-39 average. The decline of 1 percent below the February, 1947, figure was caused largely by a reduction in shipments from the Great Plains states, from Texas north to Minnesota and South Dakota.

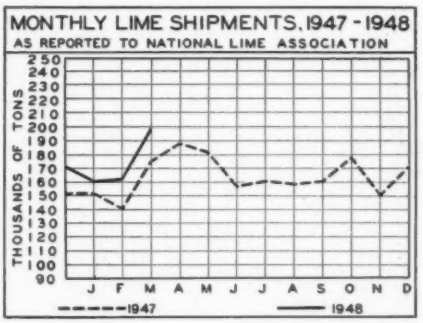
The long-term trend in production of finished portland cement, as indicated in the accompanying chart, continues its upward course. Monthly production, shipments, and stock trends, compared with the 1935-39 average, are also indicated.

Many hotels in Miami Beach and large structures in Jacksonville were built of Lehigh cement, all of which, of course, had to be shipped into the state from Birmingham, occasionally even from more distant Lehigh mills. Now with the possibility of a cement plant near Flagler Beach, Florida users will be able to buy Lehigh cement made in Florida. Although, because of the high cost of cement machinery and equipment, the plans are still in the formative stage, the construction of this plant would bring much-needed relief to the Florida building industry.

Pit Workers' Quick Action Saves Employer from Death

George L. Rack Sr., president of the George L. Rack Company, was saved from possible death by the quick action of employees after a cave-in at the Rack plant on May 20.

Workmen saw Mr. Rack buried in tons of sand when a bank collapsed. George L. Rack Jr., a son, William Haggedorn and other employees jumped into the sand and worked with their hands to remove the sand covering the elder Rack's head. Then they used shovels to free him.



According to data collected by the National Lime Association, 44 companies in March, 1948, shipped 199,049 tons of lime (119,439 quicklime; 79,610 hydrate). Reporting companies represent 49.4 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 443,000 tons. Shipments by uses and grades for March, 1948, were:

	Quicklime (tons)	Hydrate (tons)
Agricultural	1,928	21,298
Building	11,489	34,689
Chemical	106,022	23,623
Totals	119,439	79,610

Report Shows Production Gain In Brazilian Cement Industry

THE latest issue of the "Boletim do Conselho Federal do Comercio Exterior" (Bulletin of the Federal Council of Exterior Commerce), showing developments of the cement industry in Brazil, points to the fact that national production since 1938 has increased 33 percent, while national consumption has increased 75 percent over the same period.

The following table gives a detailed comparison of cement production and consumption in Brazil.

National Production of Cement	Cement Import	National Consumption*	Percentage Represented by the National Production
1938.....617,896 tons	54,092	671,982	91.9%
1939.....696,793 tons	41,099	738,877	94.3%
1940.....744,673 tons	14,896	759,167	98.1%
1941.....767,503 tons	9,943	776,846	98.9%
1942.....752,833 tons	67,200	818,795	91.9%
1943.....747,409 tons	6,985	753,388	99.3%
1944.....809,908 tons	98,473	907,436	89.3%
1945.....774,408 tons	254,757	1,028,861	75.2%
1946.....825,869 tons	350,621	1,176,490	70.2%

*Consumption figures show apparent consumption, being the total of national consumption and imports

During the period from 1929 up to 1938, not shown in the above table, production increased from 96,000 tons in 1929 to over 617,000 tons in 1938. Imports during this period dropped from 536,000 tons to slightly more than 54,000 tons.

During the years shown in the table the increase of national production was insufficient to meet consumption demands, which resulted in the sharp rise in imports. With the currently existing difficulty of obtaining cement on the international market, a huge "black market" in Brazil has been a highly undesirable outgrowth of this condition.

As a hope of successfully coping with these problems, Brazilian national production is now guaranteed by seven plants. Three of these, Cia. de Cemento Portland, Votorantim, and Cia. de Cemento Portland Perus, represent 85 percent of the entire production.

The origin of the Brazilian cement industry dates back to 1912, when two plants were built. One was Votorantim, at Rodovalho, state of Sao Paulo; the other at Cachoeiro de Itapemirim, state of Espirito Santo.

Building of the modern plant of Perus, in the state of Sao Paulo, was started in 1926 by a Canadian Company. Another plant was built according to the most modern technique at Guaxandiba, state of Rio de Janeiro. This plant was financed by the Lone Star Cement Corporation, owner of five plants in South America.

From 1935 to 1940 and during the years since, Brazilian capital has been invested in the cement industry. Votorantim built a second plant, Santa Helena, and a third one in the state of Pernambuco. The Cia. de Cemento Portland Paraiba built a plant in the state of Paraiba; while the Cia. de Cemento Portland Itau built two plants in the state of Minas Gerais and increased production in two others.

The Brazilian Government has promoted such expansion by granting exemption from duties on imported materials used by plants participating in the program and by increasing tariff on imported cement.

International Talc Company To Build Plant at Gouverneur

A new modern talc mill will be constructed at Gouverneur, N. Y., as soon as possible by the International Talc Company, officials of the company from New York City have announced.

The location of the new mill was not revealed, but it is belived that the structure will be erected in the Talcville area, the vicinity from which a bulk of the talc ore is minded.

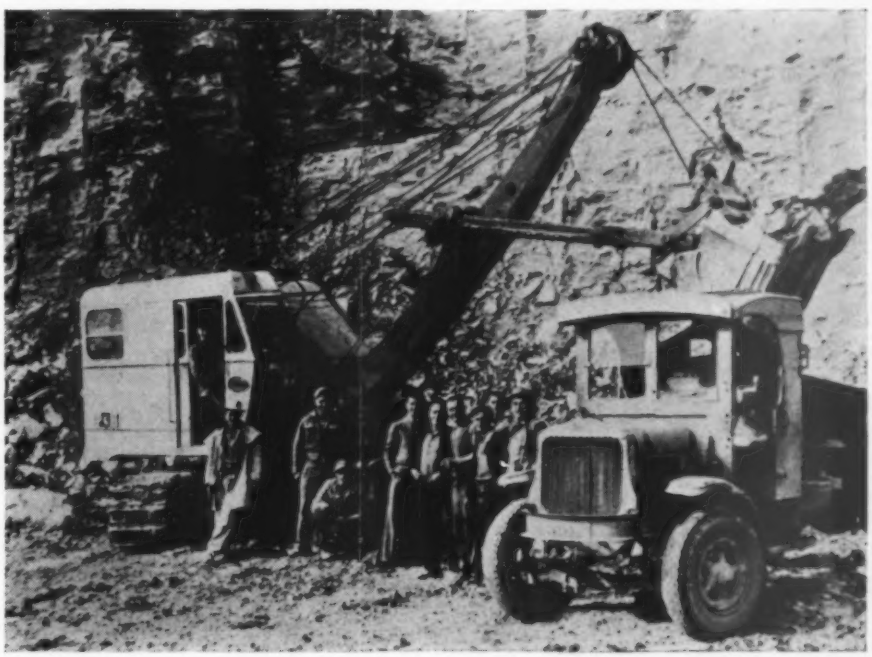
Gypsum and Gypsum Products Show Increase in 4th Qtr. and Top High

The general uptrend of activity in the gypsum industry continued in the fourth quarter of 1947, according to the U. S. Bureau of Mines. Although mine output was only 2 percent greater, imports continued high, and the apparent supply of crude gypsum was 6 percent above that of the fourth quarter of 1946. Gypsum for cement retarder gained 14 percent, for fillers 8 percent, and for agricultural use 1 percent. Calcining operations were 13 percent above the comparable quarter of 1946 and sales for most of the building products advanced.

Domestic production, imports and apparent supply of crude gypsum reached an all-time high in 1947. Domestic production was up 10 percent, imports 48 percent, and apparent supply 18 percent over 1946. Output of calcining plants attained a record total of 5,019,285 tons, 20 percent more than in 1946. Uncalcined uses consumed 1,892,196 tons.

Building plasters and prefabricated products made the greatest gains—prepared finishes, lath, tile, Keene's cement, and sheathing led with increases of 56, 49, 42, 40, and 38 percent, in the order given. Laminated board was first marketed in 1942 and reached a production peak of more than 200 million square feet in 1943. Reports for subsequent years reveal a sharp reduction in output, which in 1947 amounted to barely 1 percent of the 1943 record.

Whitehead Brothers Company has announced the removal of its offices to a new location at 324 West 23rd Street, New York 11, N. Y.



• Here is how they do it in New Zealand. Bevos Brothers operate this P & H Model 255-A shovel at the Te Kuiti Lime Works quarry on North Island, New Zealand.

Kingston Trap Rock Co. Pushing Work on Plant Of 800-T.P.H. Capacity

In March, 1948, the Kingston Trap Rock Co., Kingston, N. J., started putting in the foundations for what will eventually be a complete new 800-t.p.h. crushed stone plant. This will replace the 250-t.p.h. plant now operated at Kingston. Construction will be carried out in two stages. By late August of this year it is expected to have in operation the new primary crushing, secondary crushing and recrushing departments. Temporarily, these will feed to the existing screening plant. During the winter the remainder of the new plant will be completed in time for the 1949 operating season. The old screening plant will be retained for the screening and storage of the finer sizes.

Three 18-ton Easton TR-13 side-dump trailers and White trucks have already been delivered to haul stone to the plant. Additional units will be added when the entire project is completed. The 48-in Traylor gyratory primary crusher is already on hand. This 360-ton machine came in ten freight cars. A conveyor will carry stone from this crusher to a grizzly building, where riprap will be scalped off into cars for shipment. The smaller stone will drop to a 5000-ton surge pile, from which it will be reclaimed by a tunnel belt conveyor to a 7-ft. Symons standard cone secondary crusher. Three vibrating screens will size the product of this crusher, the oversize going to a pair of 4-ft. Symons cones to be brought over from the old plant. Two more screens will divert the fines to the old plant for final sizing and storage.

The balance of the stone from these screens will go to two screening stations —each making three sizes. Individual belt conveyors will deposit these six sizes of stone over the 150,000-ton live capacity storage. This storage is to be over an arched concrete tunnel of unusual design for direct loading to trucks or cars. The tunnel will be 40 ft. wide, with a 16-ft. clear elevation. There will be three loading lanes, two for trucks only and the middle one for cars or trucks; and there will be gates every 25 ft. in each lane. At one side there will be a belt conveyor which can be used for loading out blended sizes. The tunnel will be in two equal sections, each under three storage piles and each 370 ft. long, in order to permit trucks to shorten their run and simplify traffic by entering or leaving the tunnel at the midpoint.

W. W. Mein Jr. Announces San Francisco A.I.M.E. Program

William Wallace Mein Jr., vice-president of Calaveras Cement Co. and chairman of the San Francisco section of the American Institute of Mining and Metallurgical Engineers, recently announced the full program of meetings during his tenure of office. Mr. Mein, who was appointed by Governor Warren of California to the State Mining Board, is also secretary of the board and the member representing the nonmetallic mineral industry. The program reflects his efforts to obtain more recognition for the nonmetallic minerals in what most people

W. W. Mein Jr.

consider a gold-mining state. The nonmetallic minerals conference in 1947, of which Mr. Mein was co-chairman, aroused so much interest that a similar meeting is being held in October. Many papers are already scheduled.

A featured speaker at the regular meeting of the institute on March 10 in San Francisco was Professor Lester C. Uren, chairman of the Division of Mineral Technology and professor of petroleum engineering at the University of California. The subject of his address was *Mineral Industry Education.*

Standard Gypsum to Market Mineral Wool Products

Mineral Wool Insulations Co., whose plant is located on the slag dump of the Kaiser steel plant at Fontana, Calif., where it utilizes the slag to produce mineral wool, has concluded an arrangement whereby its product will be marketed by the Kaiser interests.

The Standard Gypsum Co. of Long Beach has taken over the distribution of the insulation product, which is produced in both granular and batt form at the Fontana plant.

The processing of the slag wool at Fontana was described in an exclusive article in the August, 1947 issue of PIT AND QUARRY.

N.L.A. Directors to Meet At Sea Island on Sept. 28

According to an announcement received from the National Lime Association, the next meeting of its board of directors and executive committee will be held at The Cloister, Sea Island, Ga. The dates scheduled for the meeting are September 28 and 29.

N.S.G.A. Board to Meet At Colorado Springs—'49 Convention at New York

Directors of the National Sand and Gravel Association have been reminded by Executive Secretary Vincent P. Ahearn that reservations for the semi-annual board meeting at Colorado Springs, Colo., must be made very soon. The group will meet at the Broadmoor Hotel amid a setting of Rocky Mountain grandeur on September 20. Applications should be addressed to J. V. Hawkins, manager.

Mr. Ahearn also announced that the 33rd annual convention of N.S.G.A. will be held the week of Feb. 14, 1949, at the Hotel New Yorker, New York City, in conjunction with the National Ready Mixed Concrete Association.

Kentucky Solons Approve $40,000,000 Turnpike Grant

A Kentucky turnpike program patterned after the famed Pennsylvania Turnpike was given encouragement on February 17 by the Kentucky Senate which approved legislation by a 27 to 1 vote to authorize an estimated $40,000,000 development. The legislation now goes to the Kentucky House of Representatives.

The bill would authorize the Kentucky Highway Department to construct at an estimated $40,000,000, a turnpike from Covington and another from Louisville running south and joining in Metcalfe county, then continuing south to the Tennessee border.

The turnpike would be financed by revenue bonds to be retired by proceeds of tolls, limited to one cent a mile for passenger cars and five cents a mile for trucks and from concessions along the super-highway.

Rosiclare Fluorspar Mine Closed by Inland Steel Co.

According to an announcement made by Paul Richards, manager, the Inland Steel Company's Hillside fluorspar mine near Rosiclare, Ill., will be closed. The company has operated the mine since 1922.

It was announced that Inland will confine its fluorspar operations to Kentucky hereafter. The Hillside property is to be sold, Mr. Richards stated.

Overlooked

Under the pressure of getting out the big May, 1948, issue of PIT AND QUARRY we committed an error which might be overlooked by most of our readers, but not by the technical ones. On page 95 of the May issue we replaced the original title of the author, W. D. Keller—"Fortified Agstone"—to "Minerals Other than Calcium in Agstone Are Often Overlooked." This was less catchy but more explanatory than the original; but we "overlooked" the fact that calcium is not a mineral but an element.—The Editor.

Lehigh Portland Cement Company Plans Extensive Improvements

Lehigh Portland Cement Co. of Allentown, Pa., in a letter to PIT AND QUARRY, reecntly announced the completion and near completion of a series of modernization and expansion projects at nine plants throughout the country.

At Metaline Falls, Wash., capacity will be increased 100 percent by the installation of one 10- by 350-ft. F. L. Smidth kiln and two 10- by 18-ft. Kennedy-Van Saun drying tube mills with auxiliary equipment. Construction on these will start in July. Already installed is an additional tube mill in the clinker grinding department to increase capacity for manufacture of mortar and and high-early-strength cement.

Considerable progress has been made toward eliminating old boilers and Corliss engines at the Mitchell, Ind., plant. Purchased power will be used. This involves substitution of motors from steam engine drives and conversion of motor drives from 40- to 60-cycle power.

Work at the Iola, Kans., plant consists of the installation of one Nordberg dual fuel diesel engine generator unit to supply 60-cycle current for new quarry equipment and for conversion from d.c. to 60-cycle current in the crushing plant. The plant has been operating on d.c: produced by five diesels. In order to implement the usage of the power-producing units a 500-kw. motor generator has been installed. Restrictions and accompanying gas shortages during the war necessitated the installation of three Unit Pulverizers. To meet the problem of continuing gas restrictions Unit Pulverizers have been installed for two other kilns.

The Sandt's Eddy, Pa., plant will soon have a new and modern change house. The installation of an electrical precipitator to collect dust from waste heat gases is about completed. Fifty percent greater storage capacity will be gained through extensinons to the raw material and coal storage and crane way now under construction. This will include additional car unloading facilities, including pits for thawing materials shipped into the plant in hopper bottom cars.

A ventilating system, including an electrostatic dust collector, has been installed at Union Bridge, Md. A new packhouse has just been completed. It is unusually narrow, with loading tracks on both sides, and is arranged so that one or two machines can pack into any one or more of four spotted cars.

An 8-ft. 6-in. by 30-ft. Compeb-mill and auxiliary equipment has been installed at Fogelsville, Pa., for the purpose of increasing capacity in the manufacture of mortor and high-early-strength cement.

Plant employees at Birmingham will benefit from the newly-completed change house. Willfley pumps will pump slurry from kiln feed basins to the kilns. Ferris wheel feeders are being installed for feeding the kilns. They will replace orifice type feeders.

At Buffalo, N. Y., electrical dust collecting precipitators and chain systems for the kilns, similar to equipment completed in 1946, is being installed on a fourth kiln. Packing facilities have been improved. The present change house has been improved and a new one constructed for foremen.

Installation of a ventilating system and an electrostatic dust collector for the powerhouse at Fordwick, Va., completes the series of projects.

International Minerals Chief Cites Europe's Phosphate Famine

Although the nations of western Europe are making some progress toward recovery from the recent war, all are hampered in the production of food by shortage of phosphate, according to Louis Ware, president of International Minerals & Chemical Corporation.

Mr. Ware, who has just returned from a business trip through five European countries, declared that the primary needs of Europe are coal and food. Coal, he said, is needed for transportation and phosphate is essential to the production of food.

The United States, with half of this year's estimated world phosphate production, he added, is currently exporting as much phosphate as in 1939, when 1,000,000 tons were sold outside the country. Mr. Ware estimated the 7,000,000 tons of phosphate expected to be produced in this country in 1947 will be about twice the amount of normal annual pre-war production.

After visiting Sweden, Norway, Denmark, England, and France, Mr. Ware said that he found all are making steady but slow progress. The Scandinavian countries are showing the best progress with their citizens hard-working, happy, and prosperous. All, he added, are cognizant of the needs for increased agricultural production.

The problems in supplying the phosphate needs of Europe, he pointed out, include lack of transportation, high shipping rates and the lack of labor and equipment on European farms.

A.S.T.M. Standards Issued In Manual on Refractories

This 264-page *Manual of A.S.T.M. Standards on Refractory Material* brings together conveniently and in their latest approved form 40 A.S.T.M. standard and tentative specifications, classifications, methods of testing, and definitions pertaining to refractories.

Certain other pertinent information of value in the testing and use of refractories, but not in the category of A.S.T.M. standards, is also included, such as suggested procedure for calculating heat losses, a suggested practice for use with A.S.T.M. panel spalling tests, suggested petrographic techniques, data on standard samples for chemical analysis, Pyrometric Cone Equivalent determinations and industrial surveys of service conditions of refractories.

New A.S.T.M. Tentatives added in the 1948 edition include specifications for castable refractories, a general method of test for thermal conductivity of refractories, a method of test for thermal conductivity of fireclay refractories, and tests for bonding strength and refractoriness of air-setting refractory mortar (wet type).

Copies of the manual may be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia at $2.50 each (paper cover) and $3.15 (cloth).

• Located seven kilometers west of Monterrey, Nuevo Leon, Mexico, is the portable rock crusher, owned by the Tritoradora Del Norte, supplying material to be used in constructing buildings and roads of Mexico. The unit has an output of 50 tons of crushed rock per hour. A "Caterpillar" diesel D4 tractor, equipped with an Athey Mobiloader, loads rock from the Santa Catarina river bed into a truck which will carry the rock to the crusher about 300 yards away. This equipment loads 60 yards of rock an hour. Powering the portable crusher is a "Caterpillar" D13000 diesel engine.

British Upward Current Cone Washes 50 Tons of Sand Hourly

A MACHINE, known as the Floatex Upward Current Cone, capable of washing sand at the rate of 50 t.p.h. has been developed in Great Britain. Although to appearances the sand is merely pumped in dirty at the top and pumped out clean at the bottom, it is scientifically treated inside the cone for the removal of minus-100-mesh silt, mud, clay, and vegetable matter such as peat.

The sand is made to fall against a rising current of clean water, the velocity of which equals the rate of which 100-mesh sand grains would fall in still water. The result is that grains finer than 100-mesh are lifted by the rising current and flow to waste at the top overflow. Only the plus 100-mesh clean sand falls to the bottom, from which it can be pumped direct to overhead bunkers.

The cone is of three-section construction. In the top section sand is pumped into a central feed box, inside which it is continually swirled, so that it falls with helical motion until it issues out of six ports set tangentially as low as possible on the outside circumference of the box. The ports are in the form of short pipes, sloping downwards so that a swirl is imparted to the water in the main body of the cone.

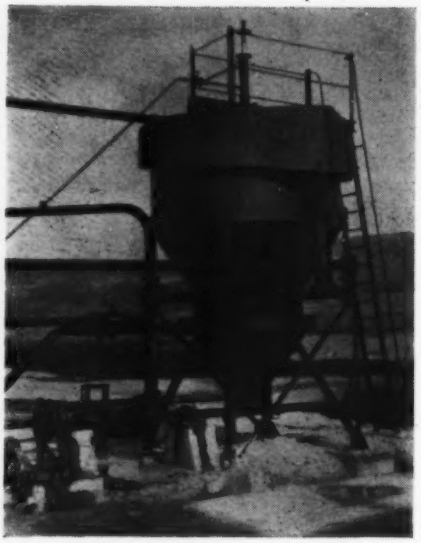
In the middle section a constant flow of clean water is pumped into the main body of the cone against centrifugal force, but in the same tangential direction, through eight equidistant ports on its inside periphery, causing swirl in the same direction as that imparted by the feed box. Thus, the whole contents of the cone, including the internal float, revolves in the same direction at a constant speed, usually of about 10 r.p.m.

At the bottom section clean sand and water is pumped out.

The rate at which the upward current rises is adjustable by means of a valve on the clean water supply. Thus, the flow of water and the rate at which 100-mesh grains fall can be readily equalized. Although an exact split at 100 mesh is not possible, owing to slight differences in shape and specific gravity of the grains of sand, very close results are obtained in practice.

In the center of the middle section of the cone a conical-shaped float fulfills the function of maintaining the vertical velocity of the upward current of water at a constant speed. In addition, it is designed to fill the idle center where eddying would otherwise take place.

In the operation of the float, the sand in falling slowly along a helical path through the annular space between the float and the main body of the cone, has the effect of increasin gthe apparent specific gravity of the mixture. As a result, the float is forced to rise a proportional amount. The fact that the sand in falling causes an equal quantity of water to be displaced prevents a decrease in velocity of the upward current of clean water. The sand pump at the bottom of the section will always pump out a constant quantity regardless of whether it is pumping clean water or a mixture of sand and water. These actions take place simultaneously and, by cancelling each other out, maintain the vertical velocity of the upward clean water current at a constant speed, regardless of variations in the rate at which sand is fed into the feed box.



Upward current washer.

To create this upward current at the correct speed initially it is merely necessary, after having correctly weighted the center float by pouring water in or siphoning water out of it, to adjust the valve controlling the clean water supply.

Five complete installations of the Floatex Upward Current Cone have been put into commercial operation in Great Britain. All of these, it is claimed, have proven fully successful. The cone is patented by Floatex Separations, Ltd., 81 South Hill Park, London, N. W. 3.

Two California Firms Show Rising Profits During 1947

The Consolidated Rock Products Co., Los Angeles, Calif., had net sales of $12,619,440 for 1947, as compared with a $9,449,707 business in 1946. Its net income was $676,867, equal to approximately 22 cents each on Consolidated's 3,074,126 shares of common stock outstanding, as compared with $392,517, or 13 cents per share in the preceding year. President Robert Mitchell revealed that a number of important equipment replacements were undertaken and pointed out that the general expansion program now in effect and completed during 1947 was accomplished without borrowing or increasing the capital debt. Consolidated produces aggregates and ready-mixed concrete and markets a wide variety of building supplies, including the entire concrete-block output of the Wailes-Bageman Co., largest producer of these units in Los Angeles. New batching plants were erected in Montebello and Santa Barbara during the year; several existing batch plants were converted to the use of bulk cement; and a $500,000 expansion program is now in progress at its main aggregates-producing plant at Irwindale.

The Blue Diamond Corp. reported net earnings for the year 1947 at $909,450, equal to $1.24 per share on the 729,313 shares outstanding. Comparative figures for 1946 showed a net of $803,410 in that year, equivalent to $1.10 per share.

The Blue Diamond report revealed that the major portion of the company's expansion program relating to production facilities has been completed; the remainder will be ready for operation some time this year. Expenditures for plant improvement aggregated $998,024 during the year. Blue Diamond operates aggregates plants in the Los Angeles area, several ready-mix plants, and a cement plant near downtown Los Angeles which grinds purchased clinker. It also produces gypsum products, stucco and plaster. Its gypsum mine and plant are in Nevada.

Welding Versus Soldering

One cause of trouble with electric motors is overload-overheating, melting and displacing solder used to connect wire conductors in the armature. Instead of soldering, connections in Elwell-Parker motors now are made by carbon-arc welding. This is done while a stream of water is played on the metal to keep down temperature.

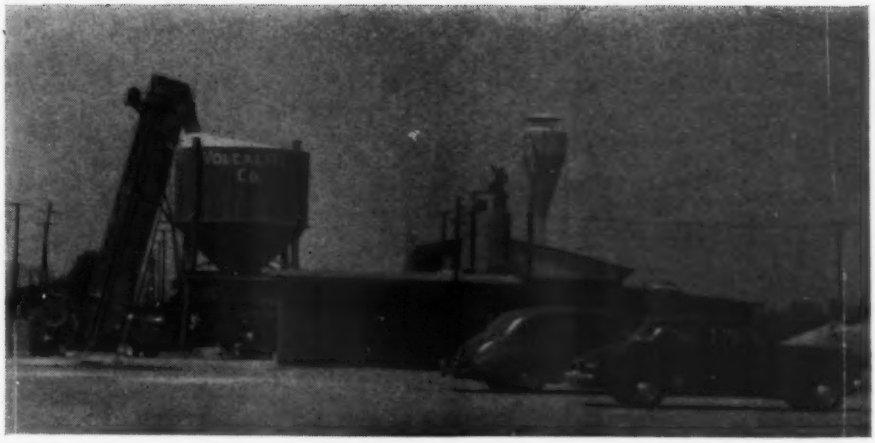
The melting point of copper is three to four times higher than that of solder. It also is higher than the heat generated in an armature in severe service.

In a 3- to 5-hp. motor as many as 65 separate welds are made, closely, evenly spaced. These connect the tips of the short lengths of wire conductors in the commutator bar neck slots at both ends of the armature coils.

All wires are insulated up to the points where they are joined after being assembled in the armature. Insulations must be protected from heat applied to melt the copper. This is accomplished by means of the water jet, led in a rubber tube to the parts near the electrode. Excess heat is localized and dispersed in the form of steam. The armature is mounted vertically on its shaft on a work bench for the convenience of the welder.

Fiberglass and asbestos (in threads and tape) now are sued for insulations, to make practically fireproof motors.

More skill, time and cost are required in the welding than in soldering; but it is a positive improvement making certain longer life for motors.



• Newest of the western perlite producers to begin operation is the Volcolite Co., of Los Angeles whose plant is pictured above. The new plant is located near El Monte, Calif. Raw material is shipped in from the company's deposit near Beatty, Nev. The rock is crushed and ground to the desired fineness by a Pacific jaw-crusher and Traylor rolls before it is expanded in a special company-designed furnace. The concern expects to utilize part of the production in various lightweight concrete products which are to be manufactured at the plant.

Decomposed Granite Forms Low-Cost Pit-Run Material Unique to Los Angeles Area

"D.G." in the Los Angeles area means "decomposed granite". It is an excavated material which has been widely used, because of its low cost, for surfacing driveways, parking lots, etc., and to a limited extent for secondary road and street work and airport runways.

In the coal-burning areas of the East and Middle West, cinders are almost universally used for a similar purpose. But in southern California, where natural gas is the universal fuel and cinders are not available as a by-product, "D.G." fills the bill nicely. The material is widely available in the hills of Los Angeles County and is subject to little, if any, processing.

Geologically, granite is an igneous rock which has solidified while molten deep in the earth's crust. Under such conditions the rate of cooling was slow; hence the texture is relatively coarse and the constituent minerals are large enough to be visible to the naked eye. They consist of quartz, feldspar and mica, with some hornblende frequently present. In ordinary decay, granite is altered by oxidation of the iron in the ferro-magnesian silicates (biotite mica and hornblende) and the formation of secondary minerals. The feldspars are kaolinized and the rock thus becomes hydrated. There then remains a relatively unconsolidated mass, the main unaltered mineral being the quartz.

A roadway or parking lot surfaced with the material is not muddy when wet, as the coarse quartz particles allow the water to soak into the soil underneath immediately. Under pressure of rollers or of traffic alone, the products of decomposition present eventually cement the mass into a comparatively hard surface.

Some Los Angeles operators use power shovels to excavate the material and load it directly into dump trucks. Others bull-doze it into piles and utilize stockpile loaders. A few scalp any plus 1-in. oversize and crush it before delivery. It is never washed or sized.

Among the leading producers of decomposed granite are the Los Angeles Decomposed Granite Co., The Walter E. Wuesthoff Co., and the State Decomposed Granite Co., all of Los Angeles; the McCaslin Material Co. of Monterey Park; The Owl Truck & Construction Co. of Compton; and the Livingston Truck & Materials Co. of Long Beach.

Construction has begun on a $200,000 warehouse and office building at Houston, Tex., which will be leased to the newly-organized Houston district of the Johns-Manville Corporation's industrial division.

The 14-state headquarters formerly located in St. Louis was split on January 1, and a Houston district office was set up under the supervision of F. W. Hodson.

• This Los Angeles operator uses bulldozers to stockpile decomposed granite.

National Gypsum's Baker Optimistic on Code Revision

Greater progress than at any previous time is being made by the trend toward modernization of building codes as a means of promoting construction activity, the use of new devices and products and the reduction of costs, it was announced by Melvin H. Baker, chairman of the Construction Industry Information Committee.

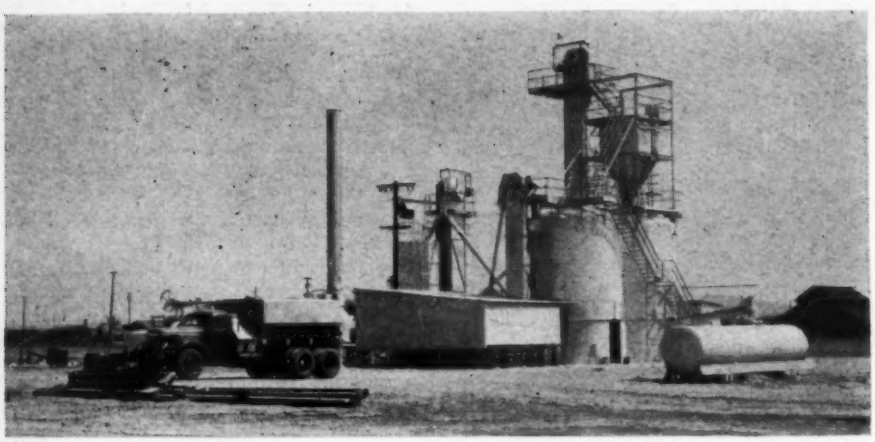
Studies by the committee's economists he said, showed that widespread action is being taken to revise old regulations and to take advantage of new technical knowledge.

"New and completely revised codes recently have been adopted in such widely separated cities as New Orleans, Kansas City, Mo., Pittsburgh, St. Louis and Toledo," Mr. Baker stated. "Completely revised codes have been prepared and are under consideration for Boston, Los Angeles, Philadelphia, Chicago and many other centers."

He declared that modernization of building regulations has received added impetus from a growing acceptance of the idea that codes should provide standards of performance in keeping with technical progress, instead of clinging to rigid specifications as to sizes, weights, thicknesses, or prescribing specific materials and methods of construction. Thus any new products which met the necessary requirements as to strength and safety would be automotically acceptable and would be adopted without delay.

"Another helpful new development," Mr. Baker added, "is the growing tendency for revised local codes to accept tests of the performance of new materials as made by recognized technical organizations, thus eliminating the costly expense and delay of making duplicate tests in each separate locality."

Among the agencies working to develop revised model building codes Mr. Baker mentioned the Building Officials Conference of America and the American Standards Association.



• The compact, all-steel plant pictured above produces roofing granules and asphaltic filler. It is owned and operated by the Gravelite Co. of Los Angeles and recently went into operation at Bassett, Calif. The plant located on the Southern Pacific Railroad and receives its raw rock supply both by rail and by truck. The rock is dried, crushed, ground and screened at the plant and shipments are made in bulk and bagged form.

Central Sand & Gravel Wins $2,700,000 Coulee Contract

Central Sand and Gravel Co., Pasco, Wash., has set up headquarters at Grand Coulee Dam to carry out its commitments in a $2,700,000 contract to supply concrete aggregate for a group of structures at the dam site. The firm's share of the giant contract involves delivery of 330,000 cu. yds. of concrete aggregate, one of the largest commitments of its kind in the Northwest in recent years. The announcement was made by Jack Martin, one of the Central Sand and Gravel Co. partners.

Award of the bid was made last April by the Bureau of Reclamation. The Pasco firm's proposal was made in conjunction with bids submitted by and awarded to the Morrison-Knudson Co., Boise, Ida., and Peter Kiewith and Sons, Omaha, Neb.

The company will have $1,250,000 worth of equipment at its disposal, including $100,000 worth of new equipment purchased in anticipation of the contract.

Respiratory Device Approval List Issued by Mines Bureau

A revised list of approximately 150 respiratory protective devices officially approved after rigid tests by the U. S. Bureau of Mines is given in a new publication available for free distribution to interested individuals and industries, Bureau Director James Boyd announced today. The list includes devices tested up to July 1, 1947.

The issuance of certificates of approval by the Bureau denotes that the various types of equipment have passed all of the tests included in established schedules of minimum requirements. By meeting these minimum requirements set up by the Bureau, manufacturers thus assure the availability of safe, and reliable respiratory equipment, Director Boyd stated.

The devices include self-contained breathing apparatus; gas masks; supplied-air respirators including hose masks, air-line respirators, and abrasive blasting helmets, hoods, or masks; dispersoid dust, fume, and mist respirators; and non-emergency or chemical cartridge masks.

To provide purchasers and users with a means for identifying approved devices, and for procuring approved parts when making repairs and replacement, the Bureau requires that all devices marketed under the approval system must carry an official approval label.

The illustrated Bureau report was compiled by H. H. Schrenk, chief of the Health Branch of the Health and Safety Division, Pittsburgh, Pa., and includes an alphabetical list of the names and addresses of manufacturers of approved devices.

A free copy of the report, Information Circular 7444, "List of Respiratory Protective Devices Approved by the Bureau of Mines," may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

Stone for Algerian Breakwater Mined and Transported by Modern Power Equipment

On the shores of the Mediterranean, in the North African seaport city of Algiers, where hand labor ruled a relatively short time ago, the M. M. Schneider Company, international contracting firm with headquarters in Paris, is using the most modern methods and tools to produce stone for a new harbor breakwater. Air-powered jack hammers, an electric shovel, and gasoline locomotives are used in the pit on the outskirts of Algiers, where straight run quarry stone for the breakwater is mined.

Jack hammers handle most of the blasting preparation in the quarry. They are used to drill vertical and side holes, winged out. In certain instances, when larger charges for shooting the rock are required, tunnels are dug for the placement of explosives.

A Bucyrus-Erie 54-B electric shovel, equipped with Ward-Leonard variable-voltage control and a 2¼-cu.-yd. heavy-duty dipper, loads large pieces of stone to a hopper which is mounted on a flat car. At another point a crane transfers the filled hopper to a truck which hauls it to the dockside where the stone is dumped into a lighter vehicle and taken out to the breakwater.

Smaller pieces of stone are sorted out by the 54-B and used to feed a crushing plant in the quarry. Stone from the crushing plant is sent to the Schneider plant in Algiers. There, some of it is used to make concrete blocks for the breakwater; the rest is used for other construction purposes.

All hauling in the quarry itself is by narrow gauge railroad with gasoline locomotives. Flat cars are used for the stone that goes directly to the breakwater, while smaller pieces are loaded to side-dump cars.

• Loading stone at the M. M. Schneider Company, Algiers, with a Bucyrus-Erie 54-B electric shovel, equipped with a Ward-Leonard variable-voltage control and a 2¼-cu.-yd. heavy-duty dipper.

30 years ago in Pit and Quarry

by Walter E. Trauffer

AGRICULTURAL limestone came in for a large share of attention in the July, 1918, issue of PIT AND QUARRY. Featured was the first of a series of articles on "Agricultural Ground Limestone" by the late Richard K. Meade, world-renowned engineer, authority on non-metallic minerals and long-time contributor to PIT AND QUARRY. Mr. Meade opened his article with a brief resume of the steps to be taken before entering into the manufacture of agstone. He then analyzed the various types of equipment available for its production and described each make or type of machine on the market. The effect of moisture content on the processing of agstone was also discussed.

Also in this issue was a staff-written report of the meeting of the Agricultural Lime & Limestone Assn., held at the Hollenden Hotel, Cleveland, Ohio, June 6, 1948. At this meeting the name of the organization was officially changed to the National Agricultural Pulverized Limestone Assn. (It may be irrelevant to point out that 30 years later, almost to the day, the directors of the Agricultural Limestone Division of the National Crushed Stone Assn. decided to change their name as detailed elsewhere in this issue.)

The chief subject of discussion was the proposed campaign to increase the use of agstone. It was first decided that all agstone produced should use the trade name "NAPLA"—the initials of the association—and that this name should be widely publicized. All members or producers using this brand name were to have the backing of the association, the one requirement being that the product pass the specification of 60 percent through 100-mesh and 100 percent through 10-mesh. G. J. Wilder, manager, urged a united advertising campaign in farm journals to promote the use of agstone.

It was also decided that semi-annual meetings be held on the first Tuesdays in June and October. The officers elected were: president, J. C. King, Carbon Limestone Co., Youngstown, O.; vice-president, W. H. Hoagland, Marble Cliff Quarries Co., Columbus, O. An executive committee was appointed and instructed to have the trade name copyrighted and the association incorporated.

Prominently featured in colors—red, white and blue—was a replica of a 1-page advertisement which the Columbia Quarry Co., St. Louis, Mo., had been using successfully to promote the use of agstone. The appeal was both patriotic and practical.

On June 26, 1918, Illinois quarrymen met at the LaSalle Hotel, Chicago, to take the first steps toward the formation of the Illinois Crushed Stone Assn. The officers elected were: president, E. J. Krause, Columbia Quarry Co., St. Louis, Mo.; vice-president, J. J. Sullivan, Dolese & Shepard Co., Chicago, Ill.; secretary and treasurer, A. J. Sullivan, U. S. Crushed Stone Co., Chicago. At this meeting the membership dues were set at one-third cent per ton on sales of all stone except fluxing stone and ballast. A. P. Sandles, secretary of the National Crushed Stone Association, also announced that members would also be eligible for membership in the N.C.S.A.

Also in this issue was a report on the meeting of the American Concrete Institute, May 27-29, at the Traymore Hotel, Atlantic City, N. J. Concrete ships were featured and a movie showed the launching at San Francisco of the 4500-ton ship *Faith*.

There was also a brief report of the annual spring meeting of the Portland Cement Ass'n at the Blackstone Hotel, Chicago, May 20-22. Fifty-four members were reported present.

In an article in this issue the editor of PIT AND QUARRY made an urgent plea for modification of the freight rate increase proposed by Director-General Wm. G. McAdoo under General Order No. 28. It was pointed out that the recent 15 percent increase was about all that contractors could stand and that the proposed new increases, about 40 to 70 percent for the average short haul, would bankrupt many contractors and producers and defeat the purpose of increasing railroad revenue. It was announced that protests would be heard July 10 by a committee in the office of the Director of Public Roads at which the secretaries of the National Assn. of Sand & Gravel Producers, and the National Crushed Stone Assn. would present the industries' case.

Plant descriptive articles in this issue included one on the crushed stone and lime plants of the Louisville Cement Co. at Milltown, Ind. Features were the hydraulic removal of the overburden and the steam generation of power for the electric motors. Another feature of these operations was the widespread use of concrete, especially for the storage bins.

In a description of the crushed stone and lime plant of the Thomasville Stone & Lime Co. plant at Thomasville, Pa., a new feature was the mechanical separation of the large kiln stone. The quarry-run stone was first dumped on a 14-in. rail grizzly over a hopper. Over-sized pieces were sledged through. A short inclined pan conveyor withdrew stone to be used for crushed stone or ballast and discharged it into a skip car for the crushed stone plant. A longer pan conveyor fed kiln stone to a double-strand roller-chain screening machine which dragged the stone over tapered screen bars, delivering plus 4- or 5-in. stone without breakage into a lime kiln skip car. The finer stone passing through the bars dropped into a bin from which it also was loaded into the crushed stone car.

A detailed article with photographs and drawings described the five glass sand operations near Berkeley Springs, W. Va. Reduction of the sandstone in these plants was by a jaw crusher followed by a wet pan. A series of three or four screw washers removed fines and foreign matter before the sand went to the draining floor. Vertical sand driers with tiers of steam pipes were used. The operation of the Berkeley Glass Sand Co. was given special attention.

Also in this issue were special articles on car supply, military highways and the working of sand and gravel pits (staff-written), and numerous news items, new machinery descriptions, etc.

New Concern to Erect Plant At Site of Limestone Bluff

The White River Limestone Products Company, a new concern with a capital of $300,000, will begin construction soon of a limestone-crushing plant at Penter's Bluff, Ark., on the White River.

Capacity will be 200 tons of finished product hourly, and markets have been established as far south as the Gulf, according to Howard A. Millar of Little Rock, a mining engineer and geologist heading the company.

V. C. Johnson of Little Rock is quarry operator. The bluff is said to have one of the largest exposed limestone deposits in Arkansas.

Finished products will include various types and sizes of crushed stone used as processing agents in chemical plants, as concrete aggregate in construction jobs and as ballast for railroads. Agricultural limestone will be produced in the plant's hammer mill.

Georgia Mica Investigation Reported by U. S. Mines Bureau

Aiding in the development of new sources of highly strategic mica, the U. S. Bureau of Mines investigated five mica-bearing properties in Georgia during World War II, according to a project report made public today by Director James Boyd.

After conducting preliminary examinations of the principal mica-producing regions of central and northwest Georgia, the Bureau in 1944 and 1945 explored five deposits by diamond drilling. The properties were the Amphlett mine in Cherokee County, the Mitchell Creek and Stevens-Rock mines in Upson County, the Battle mine in Monroe County, and the Early Vaughn mine in Lamar County.

As a result of these and similar Bureau projects, valuable information was provided on domestic mineral resources and increased quantities of strategic minerals were made available for wartime use.

WASHINGTON NEWS LETTER

AT this writing, the Capitol is the busiest place in Washington. Congress' final rush to move from legislating in Washington to "politicking" in Philadelphia will, necessarily, leave many things undone. Some of the unfinished matters of major interest to business men will be touched on later in this letter. At this date, Congress has three main choices open to it, each with its attendant advantages and risks. (1) If it decides to reconvene after the Republican convention, it may complete action on desired legislation thereby enhancing its record and, at the same time, saving precious time in the heavy campaigning months in the fall. But, it is also possible that little would be accomplished in such a session because, with the Republican platform already written, it is a ready-made opportunity for extended political attacks by the Democrats without risk to themselves. The Democrats, too, would have no incentive to advance any legislation which would reduce the efficiency of their favorite epithets about this Congress. (2) If Congress decides to wait until after both conventions are over before it reconvenes, it prevents the previously mentioned one-sided attack but only succeeds in substituting attacks from both sides. Such a session is haunted by the specter of complete futility—much-needed legislation is left waiting while endless time is spent on attack and recrimination. (3) Finally, this session of Congress could be recessed with no intention of returning save in the event of a national emergency. This has the advantage of relative certainty, but the Republican leadership runs the risk of finding it impossible to remedy any deficiencies in its record which might have become obvious at the convention. It also opens Congress to the charge that it is more concerned with the mending of its political fences than with passing important legislation. There is also the fear on the part of the Republican leadership of losing the initiative to their Democratic opponents if the President decides to call Congress back into special session. These are the general considerations upon which the ultimate decision (which, of course, will be known before this is published) will rest.

Many bills in which business men have a vital interest are unlikely to pass, at least before convention time. Among them is the one which provides further tax law changes. In addition to the income tax reduction passed over the President's veto earlier in the session, the House Ways and Means Committee has proposed a measure containing seventy-one technical changes in the law which provide further tax relief. Although its enactment probably will be postponed, this measure is far from dead. It would be no great surprise if later this year or early in 1949, we were to see the adoption of many of the proposed changes, such as the easier recognition of family partnerships for tax purposes, the simplification and change in favor of the taxpayer of the estate tax law, the substitution of a five-year carry-forward and one-year carry-back for the present two-year carry-forward and carry-back, the easing of corporate liquidations, and many others.

The Supreme Court decision of June 7, 1948, holding that the employers were required to pay the New York longshoremen time-and-one-half on the premium pay received for working at inconvenient hours points up another piece of Congressional unfinished business. The Goodwin bill designed to clarify application of the "regular rate of pay" provisions of the Fair Labor Standards Act may, ultimately, be taken off the shelf and polished up to prevent further employer liability resulting from this ruling. This would be following the precedent established when the Portal-Pay Act was passed to handle the problems created for employers by the decision in the Mt. Clemens case. In the New York case, dock workers were paid straight time for working between 8 a.m. and 5 p.m., Monday through Friday and for Saturday till noon. At other times, they are paid time and one-half. The Supreme Court found that the higher rate was not a true overtime rate as required by the law but, rather, was a differential paid for working at undesirable hours. If these undesirable hours occurred after forty hours had been worked that week, then the law, according to the Court, requires that they be paid for at time-and-one-half the night work rate. The mathematically minded will calculate that this is two and one-quarter the straight time rate. While this decision will give business men in other industries concern and will set them to reviewing their wage practices and union agreements, it is by no means clear that the decision is entirely applicable to the somewhat different conditions found in other industries.

As for the pit and quarry industries specifically, there continues to be a general question as to whether or not the Fair Labor Standards Act is applicable at all, in the case of the great many producers who do not ship their products beyond their state lines. On this point there is a lack of consistency between the position of the Wages and Hour Administrator, the Federal and State Courts, and for that matter between different Federal Courts. Probably, a decision of the Supreme Court will be required before the matter is fully settled.

One conflict on the Washington scene which will go on whether Congress goes home deals with what should be done about controlling credit. This is a very complicated problem and one with which only the monetary theorists are very much at home. But what happens to monetary controls is not a theoretical proposition but rather a practical matter which is likely to affect practically every business and banking establishment in the country. Every business which wants to expand its operations by selling stock or floating bonds will be affected. Every business which borrows money from the bank to finance inventory or to tide over a slack season will be similarly affected.

The conflict is epitomized by the differences in attitude between the Federal Reserve Board and the U. S. Treasury. Both are concerned about a further substantial expansion of bank credit which will magnify the problem of inflation. The Federal Reserve Bank appears to think that drastic action is required now to prevent further credit expansion. To accomplish this, it has used all the power available to it and has raised the member banks' reserve requirements to the limit permitted by the present law. This is likely to force these member banks to raise their interest rates to compensate for the loss of income on funds which will now have to be held as non-interest-bearing reserves.

• Geo. A. Thornton, left, (Ottawa Silica Co.) new president of the National Industrial Sand Ass'n, receives congratulations from A. Y. Gregory (Whitehead Bros. Co.), the retiring president.

National Industrial Sand Association Elects George Thornton as President

Excellent Program Features Group's 13th Annual Meeting at Hot Springs, Va.

By WILLIAM M. AVERY

another ON THE SPOT report

THE thirteenth annual meeting of the National Industrial Sand Association took place at The Homestead, Hot Springs, Va., on May 12, 13 and 14. A better than average turnout of members heard talks presented by competent authorities on such topics as industrial hygiene, current traffic problems and the outlook for rail transportation facilities, recent state actions affecting workmen's compensation insurance, federal labor policy in respect to the Taft-Hartley Act, and a broad analysis of certain aspects of the Washington scene. In accordance with the time-honored practice of this model association, all sessions were conducted on an open-forum basis, and members contributed generously to the discussions.

At the close of the three-day session new officers were elected to serve for the forthcoming year. George A. Thornton (Ottawa Silica Co.) succeeded A. Y. Gregory (Whitehead Bros. Co.) as president of the association. Sterling N. Farmer (Sand Products Corp.) and C. M. Hardy (Houghand & Hardy) were elected vice-president and treasurer, respectively. The following members were elected or re-elected to the board of directors: Hamilton Allport (Standard Silica Corp.), J. S. Coxey, Jr. (Industrial Silica Corp.), E. M. Durstine (The Keener Sand & Clay Co.), James B. Bergs (Pioneer Silica Products Co.) and Arthur B. Schlesinger (New Jersey Pulverizing Co.).

Bagging Machines In connection with a progress report of the association's hygiene committee, Stanton Walker, consulting engineer, briefly analyzed some of the important characteristics of proposed new designs for bagging machines to be used by the silica flour industry. All the proposals feature start-stop design, with the machines operating only when bags are actually being filled, or about 25 percent of the time. This, Mr. Walker pointed out, promises about 75 percent less wear than present designs, and the use of harder metals may effect further reductions.

If it can be built, Mr. Walker said, the most acceptable design incorporates a universal chassis on which two one-bag, two-bag or three-bag machines can be mounted as required. In this design a housing covers one set of spouts while the operator is placing bags at another set, thus protecting the man from exposure to silica dust.

Blasting Manual A. Warsaw (Wedron Silica Co.) presented a report on the status of the association's manual entitled *Maintaining Safety in Sand Blasting*. Prepared for N.I.S.A. by the Industrial Hygiene Foundation, the manual is now in its second preliminary draft. The project was undertaken as a purely voluntary service to industry in the cause of health conservation and safety. After the entire membership of the association has had an opportunity to comment on the second draft, it is proposed to print the manual in booklet form, which members may purchase at cost for distribution to their customers.

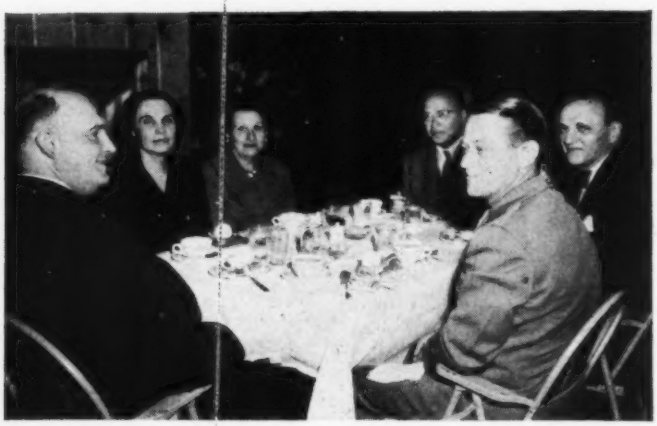
Compensation Insurance Theodore C. Waters, association counsel, discussed recent actions in the states which affect workmen's compensation in-

• The Campbell Clan (Sun Sand Co.) came in force, three generations strong. Seated are Mrs. R. William Lowe, Mr. and Mrs. E. J. Campbell, and Alan Campbell, who assisted us materially in our picture taking activities. Mr. and Mrs. Harte Campbell are standing.

• Ted Waters (Association counsel), Alfred J. Miller (Whitehead Bros. Co.), Mrs. Waters, Mrs. Miller and William W. Colin, Jr. (Commerce Counsel for the association).

• We caught Mrs. Walter Lenhart and Mr. and Mrs. Jack Newhouser in a jovial moment. The joke (if there was one) slipped by us.

• Mr. and Mrs. Arnold H. Tanzer (New Jersey Pulverizing Co.), Marcus S. Wright, Jr., (South River Sand Co.) and Mr. and Mrs. Arthur B. Schlesinger (New Jersey Pulverizing Co.).



• Mr. and Mrs. N. H. Crissey and Mr. and Mrs. A. Warsaw (all of the Wedron Silica Co.), Raymond S. Smethurst (Counsel, National Ass'n of Mfrs.) and Vince Ahearn (executive secretary of the N.I.S.A.).

• Mr. and Mrs. Theodore C. Waters, Charles G. Runkle (Ayers Mineral Co.), Mrs. George Thornton and James B. Bergs (Pioneer Silica Products Co.). Photo by Alan Campbell (Sun Sand Co.)

• Miss Nancy Putnam, Frank T. Rogers (The National Silica Co.) E. J. Campbell (Sun Sand Co.), Stanton Walker (consulting engineer) and Mr. and Mrs. John F. Putnam (The National Silica Co.).

surance. He pointed out that two bills introduced at the current session of the New Jersey legislature would have added to the list of scheduled diseases "pneumonoconiosis in any form." The enactment of the bills, Mr. Waters said, would bring about several undesirable changes in the present New Jersey Compensation Statute:

(1) Whereas under the existing law partial disability is not compensable, it would become compensable under the proposed laws.

(2) The so-called escalator clause which limits monetary liability under the present law would be discarded.

(3) The proposed laws would nullify the present requirement that claims for silicosis and asbestosis be filed within one year from the date of disability or death.

At present, Mr. Walters said, the bills are on the inactive roster for the session, but it is possible that something may happen to bring them to life. Since the legislature will probably continue in session throughout the entire year, he urged

that the course of the bills be followed closely.

Another bill has been introduced for the purpose of extending from one to two years the statutory limitations on compensable occupational diseases. Although on the face of it this might seem an innocuous change, Mr. Waters pointed out that it represents an effort to weaken the defense of limitations and to enable claimants to file claims within an unreasonable length of time after the injury has occurred. Both the employer and his insurance carrier, Mr. Waters said, should have statutory protection to terminate their liability within a definite and reasonable period of time after employment has ended.

Mr. Waters reported that the Insurance Commissioner of the State of New Jersey has granted two 10 percent reductions, effective January 1, 1948, and July 1, 1948, in workmen's compensation insurance rates applicable to silicosis. It is hoped that this action, which is in line with the continued favorable experience of carriers insuring silicosis risks, will serve as a pattern for action by the insurance commissioners of other states. The speaker, however, saw little hope of any prompt favorable action being taken by the committees of the National Council on Workmen's Compensation Insurance, which is the rate-making agency of the stock and mutual insurance carriers. In view of this, he suggested the advisability of further approach to the insurance commissioners of the individual states.

Traffic Problems William W. Colin Jr., commerce counsel for the association, discussed various current traffic problems affecting the industrial sand industry. He pointed out that at present average transportation charges on industrial sand are substantially more than the purchaser pays for the material itself, and that in a recent tariff proposal sand was the only material singled out for a minimum rate increase.

According to Mr. Colin some progress has been made in the new descriptions, in which tariff rates for sand are based on the type of equipment used in shipping, rather than on the use of the product. He added, however, that the carriers still persist in regarding industrial sand as a luxury product, properly subject to higher tariffs than common sand.

As a direct outcome of Mr. Colin's remarks and the ensuing discussion, the meeting voted unanimously to authorize the incoming president of the association to appoint a traffic committee to deal with the entire problem of tariff structures and descriptions.

Industrial Hygiene Theodore F. Hatch, research director of the Industrial Hygiene Foundation, presented an interesting report on the progress which has been made in regard to silicosis. Although it has been assumed from limited data that the particles which are of importance in producing silicosis are in the range of 1 to 3 microns, according to Mr. Hatch the relative importance of particle size of dust has not been established to date. Because of low retention in the lungs, it was long felt that particles smaller than 1 micron were of no importance. Today, Mr. Hatch said, there is a growing interest in finer particles, even down to sub-microscopic sizes.

The speaker pointed out that most of the present knowledge of silicosis as an industrial problem comes from systematic studies in a very few industries, augmented by cases in many other industries. As a result, he said, there has been a tendency toward broad generalizing, and the mere presence of silicosis in an operation is sometimes given too much weight.

As an example of this type of generalization, Mr. Hatch cited the reputation for silicosis hazard held by the industrial sand industry, based primarily on the fact that silicosis cases have occurred, rather than on a systematic study to determine the true extent of the hazard. A systematic medical study of the industry, properly correlated with environmental data, would be most valuable in providing better information than is now available.

Ahearn's Report Vince Ahearn, executive secretary of N.I.S.A., opened his report with a review of recent developments in the association's efforts to obtain reduced compensation rates applicable to silicosis. Favorable action on the part of the National Council on Workmen's Compensation Insurance, in the speaker's opinion, will serve the industry's interest better than separate action in each of the states.

Mr. Ahearn referred to the quarterly studies of car requirements which were made last year for the Association of American Railroads. The predictions, he said, were remarkably close to the actual car loadings. In addition to performing a real service to the carriers, they provided an accurate forecast of the business outlook for the industrial sand industry.

The speaker, whose shrewd comments on the Washington scene have long been the outstanding feature of N.I.S.A. meetings, made a number of predictions regarding future developments. He believes that Congress next year will vote to extend Social Security to cover every employed person in the nation, and that old age benefits under the act are almost certain to be increased. In regard to government control of industry, Mr. Ahearn predicted that if voluntary allocation of materials, as provided for in the Taft-Wolcott Bill, ever starts, that almost inevitably some form of the old War Production Board controls will return. Citing the steel industry as an example, he said that if as much as 20 percent of steel production should be allocated, it will be absolutely necessary to control the remaining 80 percent.

The certainty of some form of draft or selective service law has a direct bearing on the problem of manpower supply, Mr. Ahearn stated. In urging the industrial sand industry to discard all its old notions with respect to the kind of manpower it can use, Mr. Ahearn expressed the belief that the nation is now on the threshold of a manpower crisis far more critical than was experienced during World War II. For this reason, and because materials and equipment are almost certain to become scarce, he urged his audience to do everything possible now to put plants in first class operating condition.

Car Supply R. E. Clark, manager of the Closed Car Section, Car Service Division, Association of American Railroads, discussed the outlook for railroad transportation facilities. The picture he painted was, on the whole, not too encouraging. Due to poor loading during the first four months of the year, the railroads now have in prospect the job of moving out 200,000 cars of old grain in addition to the new crop. Coal and other commodities were also off during the same period, creating deficits which the carriers will probably have to make up during the peak season.

Although still far from bright, the car ownership picture, as sketched by Mr. Clark, shows some improvement over a year ago. Hopper-bottomed cars show a gain of about

• Right: Mr. and Mrs. Jessie T. Morie (Jessie S. Morie Son). Mrs. Morie said it would be impossible for us to take a picture of her that wouldn't become the basis for a libel action. We're prejudiced, of course, but we think this one came out rather well.

• Left: Mr. and Mrs. Forrest S. Pearson (Standard Sand Co.) and George F. Pettinos, Jr.

5,000 over a year ago, and ownership of covered hoppers has also increased, although this is partially offset by an increase in the demand for this type of equipment. Even with complete delivery this year of the 19,000 gondolas now on order, retirements are almost certain to prevent any gain in this category.

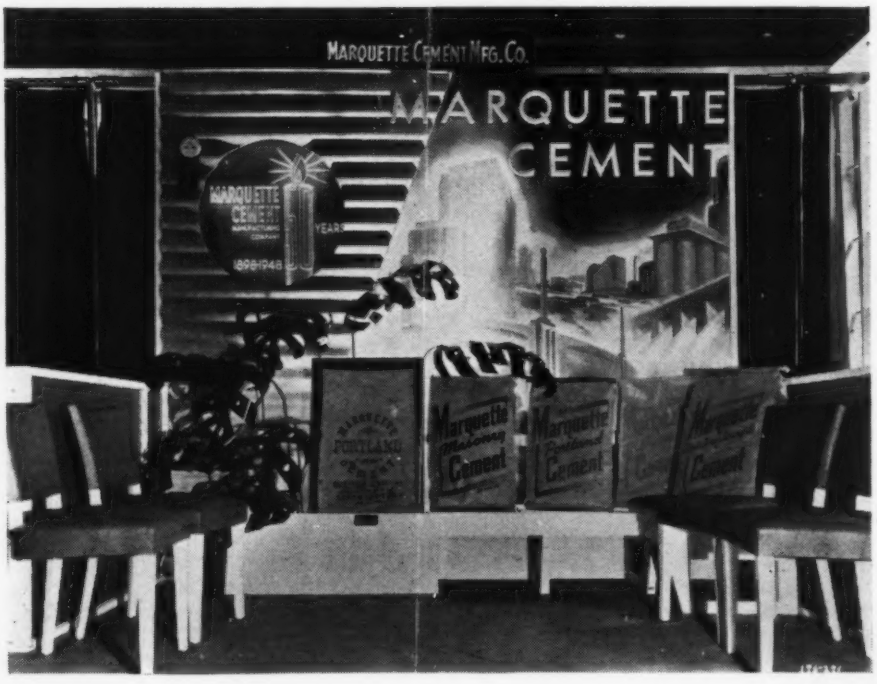
New cars, Mr. Clark said, are now being delivered at the rate of 8,000 per month, still short of the 10,000 per month goal that the railroads set some time ago. If the goal can be attained in the near future, ownership of all types of cars would show a yearly increase of 40 to 50,000 units.

Labor Policy *Federal Labor Policy as Reflected in the Taft-Hartley Act* was the subject of a talk by Raymond S. Smethurst, counsel for the National Association of Manufacturers. According to Mr. Smethurst, the Taft-Hartley Act has not produced any of the dire consequences that were freely predicted at the time of its passage. It proved effective in settling the coal dispute, and probably had at least some psychological influence in averting a railroad strike.

The speaker pointed out that the only serious setback the law has received so far has been in regard to the provision which bans political contributions by unions. He predicted that the Supreme Court will rule that this section of the law is unconstitutional.

Upon request, Mr. Smethurst commented briefly on the recent Supreme Court decision in regard to the multiple basing point system in the cement industry. He stated as his opinion that the decision probably sounds the death knell of the whole multiple basing point system. He pointed out, however, that the court order merely says that the companies shall desist from any concerted action with respect to a multiple basing point system, thus actually leaving the whole question of basing point and zone price systems completely up in the air.

Entertainment As the accompanying photographs indicate, a majority of the producers who attended the 13th annual meeting of N.I.S.A. came with their wives. Entertainment for the ladies included a bridge tea on the first afternoon, a luncheon at the Greenbrier in White Sulphur Springs on the second, and a golf tournament on the closing day. The association's annual picnic, originally scheduled to be held at the Cascades, was shifted to the Homestead Pavillion due to wet weather.



• Right: Prize-winning exhibit of Marquette Cement Manufacturing Company, which is currently being shown at building supply dealer conventions throughout the Mississippi Valley. Distinctive feature of the display is the large circular symbol (upper left) executed in plexiglass and edge-lighted to give the effect of shimmering gold. This effectively symbolizes the 50th anniversary of Marquette's founding, which is being celebrated this year. Framed at the left of the company's products is an interesting memento of 1898: a cloth sack used in one of the earliest shipments of Marquette Cement from its original plant at Oglesby, Ill., before the turn of the century. This exhibit was awarded first place among more than 200 building materials displays at the Northwestern Lumbermen's Association convention held at Minneapolis, Minn., January 11, 12 and 13.

Screenings

by William M. Avery

OUR item in the May issue, in which we speculated plaintively about what happens to the sand that is dumped periodically into our youngsters' sand box, drew an immediate response from A. Y. Gregory, executive vice-president of Whitehead Brothers Co., who courteously offered to supply the next replacement lot. Mr. Gregory's kind offer will have to be tabled for the moment, since we just purchased a full cubic yard of the stuff, and the head of the family is already muttering that we've turned our bailiwick into a glorified sand pit.

We're now debating whether or not to run an item speculating on what happens to the shekels we put into our checking account from time to time. Who knows? Maybe somebody will crash through with an offer of assistance in *that* department.

Scotland Yard Takes Over

THE following item from the London Exchange Telegraph Agency provides a revealing sidelight on British thoroughness: "A skeleton unearthed in a gravel pit at Keyingham, East Yorkshire, is believed to be that of a Bronze Age man. A decorative ceremonial vase was found alongside the body. Police may hold an inquest."

If those Bronze Age yeggs think they can get away with that sort of hanky panky, they just haven't reckoned with Scotland Yard. Perhaps the Yard could borrow Ali Oop's time machine for their investigation.

Maybe She Can Cook

VISITORS to the Chicago Road Show, scheduled for July 16th to 24th, will doubtless find that some of the exhibitors are going in for sleek, stream-lined effects, and to hell with the draperies. This fundamental approach isn't likely to reduce the temperature along the

lake front, but it has its points, as anyone with half an eye can see.

The caption under the accompanying photograph, sent to us by a manufacturer of dragline buckets, states rather arbitrarily: "This equipment is used for construction work, farm irrigation and ditches." We suppose, however, that once the customer acquires title, he is allowed *some* latitude in developing other uses. After all, the manufacturer may have overlooked one or two latent possibilities.

Protective Measure

THE ceiling and upper walls of the Convention Hall in Philadelphia have been sprayed with asbestos in preparation for the Republican and Democratic national conventions. Officially the project is described as an effort to improve the acoustics of the hall, but we can think of a much better reason for having the place lined with asbestos during the political conventions. Considering how lukewarm everyone is about Mr. Truman, the Democratic affair probably *does* need a little acoustical help, but as far as the Republicans are concerned, we'd be willing to bet that the fire underwriters insisted on asbestos.

Astral Direction

THE *Engineering and Mining Journal* has a well-earned reputation for accurate reporting. Even so, our left eyebrow, always a bit unmanageable, went up a fraction of an inch when we read the following: "The Moorlight Co. has for a number of years been the largest producers of battery manganese ores in the United States, and is under the direction of the late John Hickey."

It's probably okay, though. We suppose the department heads gather in a darkened room each morning, and hold hands in a circle while they wait for John to come through with the orders of the day. Wonder if the Federal Trade Commission has checked up to see if that constitutes an unfair trade practice?

another ON THE SPOT report

Lime Production Increased

THE industrial importance of New England which has, for many years, been fading through the migration of many of its most important industries to other areas, took a sharp jump upward recently, when the Lee Lime Corporation completed a sweeping improvement and expansion program at its Lee, Massachusetts, lime plant. Over $500,000 was spent to put this plant on a par with the best operations in other sections. These major improvements included a new 7½- by 125-ft. Kennedy-Van Saun rotary kiln, equipped with preheater and deheater. This replaces ten old vertical kilns. A new crushing plant was also built.

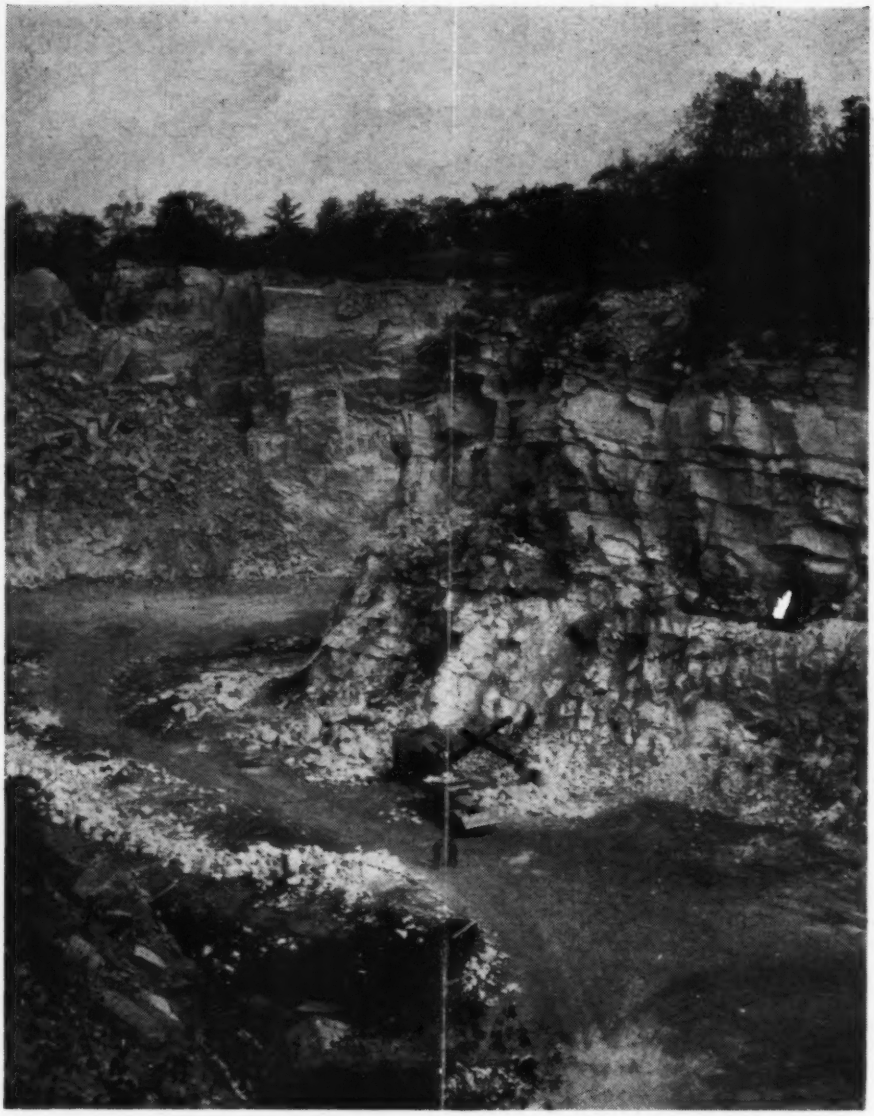
While there has not yet been sufficient time for accurate operating data to be made available, it is evident that these improvements have considerably increased the capacity of the plant—from 45 to about 130 tons of lime daily—and that production costs have been noticeably lowered. The quality and uniformity of the lime produced has also been improved. At the same time the capacity of the limestone department has been appreciably enlarged.

In 1880, Martin Deely established the Lee Lime Corp., at Lee, Mass., to supply lime to the highly important New England paper industry. For ten years the company supplied primarily local customers, concentrating on shipments of lime to the paper industry. In later years shipments were made into Maine, New Hampshire and eastern New York.

The next major development in the business of the corporation was its entrance into the agricultural limestone business. It was one of the pioneers in providing this material in Massachusetts, as well as the rest of New England. This part of the enterprise has grown rapidly, with 73,000 tons of agricultural limestone sold in 1946 under the Federal Agricultural Conservation Program alone. For the past six years, the corporation has employed 16 Baughmann spreader trucks for the distribution of its bulk limestone.

Other big customers for agricultural limestone are the large farm cooperatives in this area, and fertilizer companies. These, when combined with the large dealers' accounts sold, boost the tonnage well over the 73,000-ton figure given above.

The company is now headed by John M. Deely, who in his capacity as president is the third-generation member of the Deely family to operate the Lee Lime Corp. The program of improvement was initiated by him and carried out under his direction. His son Jack, a veteran of the recent war, is acting as assistant to the president. There are not many businesses in the pit and quarry industries that have been so long administered by one family.

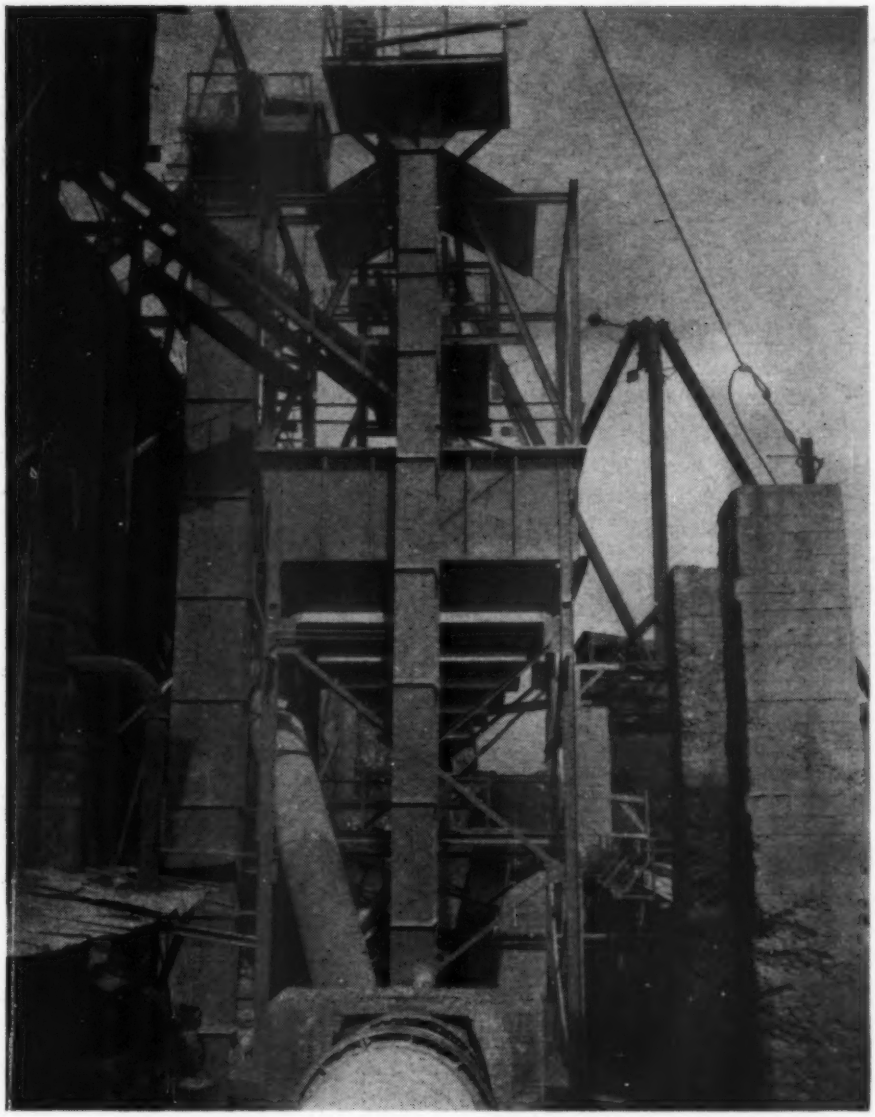


• A view of the Lee Lime Company's quarry at West Stockbridge, Mass., showing a shovel and a truck.

At present two separate plants are being operated by the Lee Lime Corp. The first and oldest in continuing operation is located at Lee; the other, a more recently acquired property, is on the outskirts of West Stockbridge, Mass., 12 miles to the west. Production at the Lee plant is devoted primarily to agricultural limestone, hydrated lime and quicklime. At West Stockbridge, asphalt filler, flux stone, agricultural limestone and terrazzo are produced. Production at West Stockbridge totals 300 tons per day, while the total output at Lee is over 2500 tons per week. No stone is burned in the West Stockbridge plant, all products being shipped in the forms mentioned.

Many important improvements have been made to the company's West Stockbridge plant. The most striking development has been the installation of a 54- by 30-in. Jeffrey Type B-3 pulverizer. This machine reduces shovel-size stone in one operation to a product 70 percent of which passes federal specifications for agricultural limestone, i. e. 100 percent through 20 mesh and 40 percent through 100 mesh.

At Lee, the primary plant to be discussed here, blasted and broken stone in the quarry is recovered by a ¾-cu. yd. Marion track-mounted



• The rotary dryer at the bottom delivers stone into a bucket elevator and on into the 4-compartment bin.

Considerably by Lee Lime Co.

shovel. International 2½-ton dump trucks are used to haul the material to the crushing plant. Both Ingersoll-Rand and Gardner-Denver drills are used to facilitate primary and secondary blasting in the quarry.

At the plant the dump trucks discharge their loads onto a McLanahan and Stone reciprocating feeder. This feeder acts to prevent violent surges of stone from swamping the crusher and gradually feeds each load into the jaws of a 24- by 36-in. Farrel-Bacon crusher. The raw crusher product falls into an open bucket elevator and is passed over a vibrating screen. From here material over 1½ in. in size is sent to a No. 12 Kennedy-Van Saun gyratory crusher with a built-in 50-hp. synchronous motor, for secondary reduction. Minus 1½-in. to dust-sized stone is chuted into a 6- by 60-ft. rotary drier, which utilizes waste heat from the rotary kiln. If necessary, waste heat can be supplemented by oil burners. Dried stone is sent to another set of vibrating screens and chuted to a 4-compartment Blaw-Knox bin. The compartments hold 1- to 1½-in.; ¾- to 1-in.; ½- to ¾-in.; dust to ½-in. stone, respectively. These separate compartments are discharged in turn.

The dust to ½-in. material is also continuously carried by a separate conveyor to storage ahead of the agricultural limestone department. For this storage, three of the old vertical kilns are utilized. The other three sizes of stone are stored separately ahead of the preheater of the rotary kiln. Four old vertical kilns are used for this purpose.

The result of this careful sizing is that uniform stone is fed to the rotary kiln at all times. In addition, the flexible conveying system will allow the entire output of the crushing plant to be sent directly to the agricultural limestone department if the storage for the rotary kiln is full.

Two power-driven belt trippers operate on the two conveyors above the 10 kilns, facilitating discharge of the various sizes into the proper storage bins.

A McLanahan & Stone coal crusher has been installed to handle run-of-the-mine coal shipments. The product of this crusher is conveyed to storage, utilizing one of the raw stone elevators and conveyors after quarry operations have ceased. The remaining three upright kilns are used for coal storage.

Belt conveyors below each of the kiln bins in turn take the sized kiln feed stone to a main belt conveyor, which then feeds the crushed material into a 100-ton enclosed bin directly above the Kennedy-Van Saun preheater. This bin acts as a surge and insures even feed in the new rotary kiln.

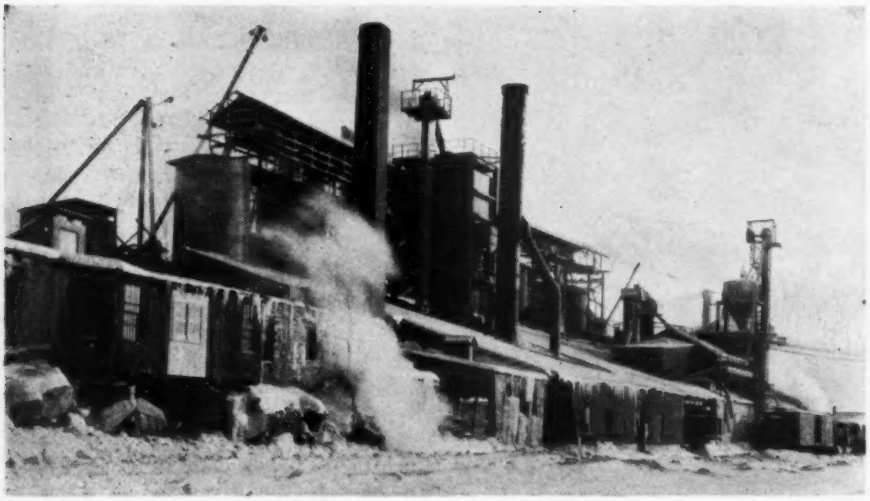
The waste heat from the kiln is circulated by means of a fan, driven by a 150-hp. Westinghouse synchronous motor, through this material, gradually bringing it up to a temperature of around 950 deg. F., as it enters the kiln.

The new Kennedy-Van Saun rotary kiln is now in operation, replacing the old vertical models. The company expects this new kiln to produce 5 tons of lime for each ton of coal, instead of the 3 to 3½ tons per ton of coal produced by the ancient verticals.

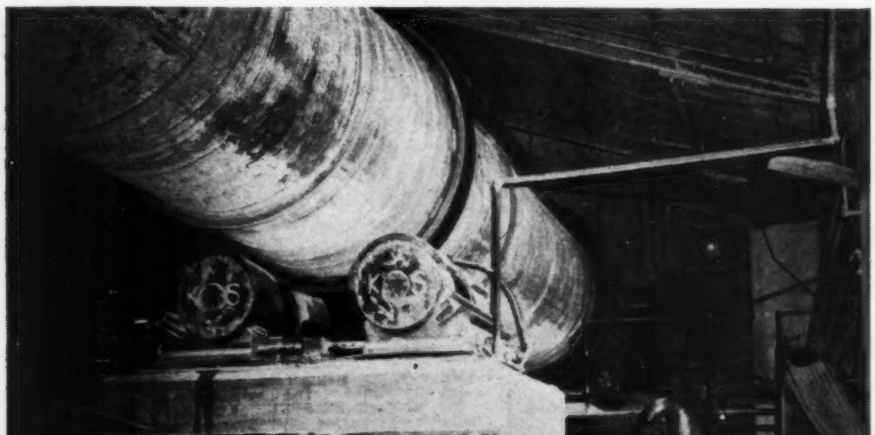
In all, with the kiln preheater and deheater in operation, the company expects to save 33 1/3 percent of the cost of manufacture over the old process. Both fuel-per-ton and labor-per-ton costs enter into the total saving.

The product of the kiln discharges into the deheater. The waste heat from the deheater is introduced into a Kennedy-Van Saun coal pulverizer to insure that dry coal is being ground in this mill. The product of the deheater is a soft-burned lime; and as it comes from an excellent grade of dolomite, it is a highly salable product.

From the deheater the lime is sent to a 4-compartment lime storage bin which was utilized in the old operation. Before entering this bin the material is screened to remove any fines which might be produced in the burning process. These fines are chuted to a separate compartment.

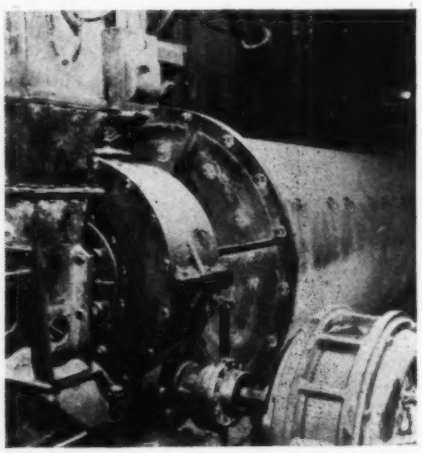


• A trackside view of the Lee Lime Company's facilities at Lee, Mass.



• The new 7½- by 125-ft. rotary kiln, which replaces the ten old vertical kilns.

• This gyratory crusher operates in closed circuit with a screen above to the right.



• Waste heat from the deheater is introduced into a coal pulverizer to dry it.

Pulverized quicklime is produced here through the use of a Raymond impact pulverizer, which reduces the burned lime to the required fineness for pulverized lime shipment. Hydration is done in a Kritzer continuous hydrator with the product of this machine going first to bins and then to the packing department.

The bagging departments are separate, a St. Regis 3-tube packer being used to bag 100-lb. paper bags of limestone, a 2-tube unit sacking 80-lb. bags of pulverized quicklime, and a 4-tube unit at work on 50-lb. sacks of hydrated lime.

The kiln unit in this plant has been extensively instrumented by the Leeds & Northrup Co. Mr. Deely hopes, by use of automatic controls, to reduce the human errors inherent in man-controlled operation, thus enabling the product to stay almost exactly on the center-line of any specification.

The plant is far advanced in fields other than the lime industry. In the interest of good labor relations, key members of the organization are

(*Continued on page* 73)

• A closeup of the kiln control board.

Mechanics, Techniques and Economics of Expanded Clay-Shale Aggregate Production

another P and Q exclusive

MEANT neither as a technical reference nor as an engineering guide, this series of discussions is primarily presented to clarify some of the basic concepts, manufacturing problems, and economics of plant operation with which the present or would-be producer should be familiar.

Often, when we come up with a relatively "new art" in industry, we find that some one, somewhere, has tried or accomplished the same thing before us. Particularly have the ancients retained their full share of the prior art in innumerable fields. We should not be too surprised that the advantages of lightweight aggregate for concrete masonry were already known and exploited in some roof structures of Roman temples.

There is little doubt at this time but that lightweight building materials form a logical development, to be further and more widely exploited at an increasing rate. Many such aggregates have made their appearance in recent years—fostered and furthered primarily by the extensive concrete block industry. However, the discussions here will be chiefly concerned with materials produced atificially from the natural clays, shales, or suitable earth-rock deposits, rather than with those derived from water or steam-expanded furnace slags, fuel-ash cinders, or natural materials of volcanic nature or origin. Clays and shales are closely interrelated, and the term "clay"

By WOLF G. BAUER

will be used hereafter to designate all earthy and feldspathic rock materials suitable for this purpose.

Quality Clay In numerous instances in the past a raw material of "inferior" quality, or of some specific shortcomings as judged by one industry, finally becomes valuable and of commercial importance in a newly created manufacturing and consumer field.

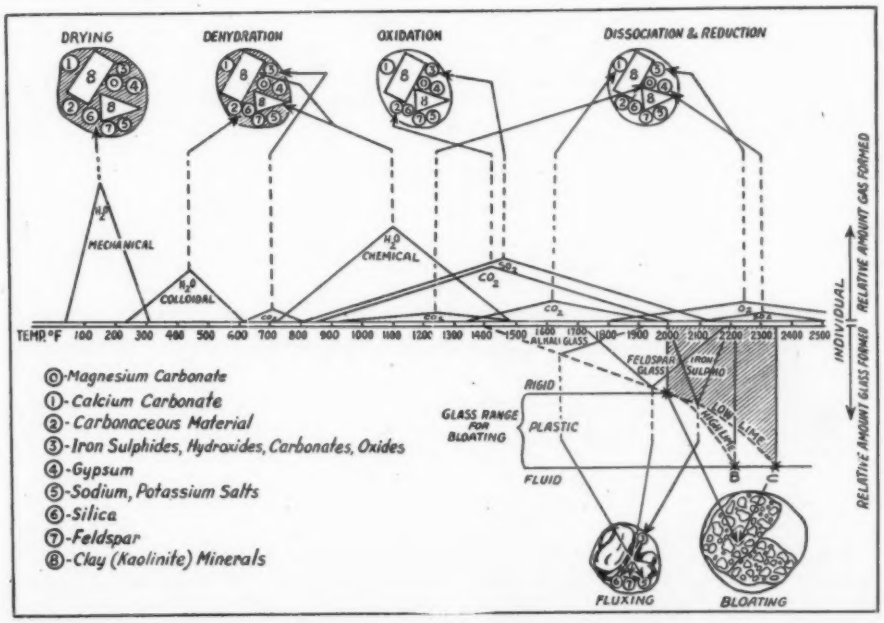
The ceramic industry represents one of the oldest industrial arts, a main stem of the ever-branching tree of industrial development. Its progress and importance in various parts of the world became, to a great extent, a function of the availability and quality of the shales and clays of each locality. Within comparatively recent times the increased use of unfired artificial masonry made from cement and natural aggregates caused the concrete block industry to assume a very competitive aspect in relation to the older and more well-established ceramic brick and building materials industry.

It would almost seem a whim of fate and irony, a matter, perhaps, of adding injury to insult, that we have witnessed a competitor industry taking the raw materials considered "inferior" by the one, and processing them for use in products which are often directly competitive with those made of the high-grade raw materials by the other. We are referring, of course, to lightweight building blocks and brick made of expanded clay aggregate by the one, and ceramic bricks and hollow building tile made from fired un-bloated clay by the other. (Some clay brick manufacturers, however, have pioneered and produced expanded brick for insulating purposes in the past, and such concerns as the Batelle Institute and the Ozark Chemical Co. have engaged in research in this field.)

What Constitutes Lightweight Aggregates? Lightweight aggregates consist of any mixture or aggregation of fine and coarse particles of material which, because of its strength, size gradation, chemical and physical stability, low bulk density and absorption, makes it suitable for mixing with cement to form a concrete having certain pre-determined characteristics for building purposes.

Under A.S.T.M. specifications, maximum ignition loss of 25 percent, and low-temperature volatile matter of 5 percent maximum have been set up. Certain grading of particles has also been prescribed, and can be referred to under designation C 130-42. When the aggregate is to be used in concrete exposed to moisture, a maximum weight loss of 12 per cent is permitted under accelerated sulphate soundness test. Maximum bulk weight of fine aggregate of 75 lbs. per cu. ft., and coarse aggregate of 55 lbs. per cu. ft. is usually met by a large margin. Thus, for example, if a piece of bloated clay just barely floats on water, *i.e.* has a density of 1.0, or weighs 65 lbs. per cu. ft., an aggregate of the same material, having 30 percent void space, would weigh 65 x .70 = 45.5 lbs. per cu. ft. bulk. It can be seen under the limits of the given specifications, that considerable leeway is provided to grade

• Fig. 1. Principal stages of gas-forming reactions in relation to the glass-forming reactions along the temperature scale.



aggregate of this density with natural sand fines or with heavier partially-expanded materials.

Table 1 lists some of the various aggregates in order of specified weights as compiled by the Office of the Housing Expediter, Washington, D. C. This density sequence is also indicative, in a general way, of the order of resulting concrete strength under similar mixing ratios. The reasons and corrections of this aggregate strength problem will be discussed later.

Table 1

Aggregate	Weight/Cu.Ft.	Concrete Wt./Cu.Ft.
Gravel	120	150
Sand	90 - 100	150
Crushed stone	100	145
Crushed bank slag	80	110 - 130
Haydite	40 - 60	100 - 120
Foamed slag	40 - 60	90 - 100
Cinders	40 - 50 (+sand)	110 - 115
Pumice	30 - 60	60 - 90
Diatomite	28 - 40	55 - 70
Perlite	6 - 16	40 - 65
Vermiculite	6 - 10	25 - 50

Need for Investigations The pyro-processing of silicate minerals and natural mixtures in the form of clays and shales, has been the heart and substance of ceramic technology. Standing, as we do, on the threshold of a rapidly-developing artificially-expanded aggregate industry, the methods, techniques, know-how, and co-operation of ceramic engineering laboratories and investigators need increasingly to be solicited to solve some of the many problems yet confronting this field. Now that some of the patent shackles have been lifted, a concerted effort by present, and potential manufacturers to engage ceramic research institutions and universities in this work should be initiated.

There are many regions in the United States and Canada which do not have available suitable natural lightweight materials or by-product slags from metallurgical operations. However, our good earth contains everywhere an immense quantity and variety of clays, shales, sedimentary, metamorphic, and intrusive rocks which, either *per se* or through certain additions or mixing, or through various process steps, may be caused to develop the required characteristics of lightweight aggregate. It is, therefore, with a view toward encouragement as well as caution, that we would present the fundamental factors of processing to those considering lightweight aggregate manufacture. Encouragement is in order insofar as the simplicity of the process with suitable raw materials and the possibilities for making feasible the use of inferior materials are concerned. Caution is in place in the extreme engineering demands in designing for economical operation in this low-profit-margin field.

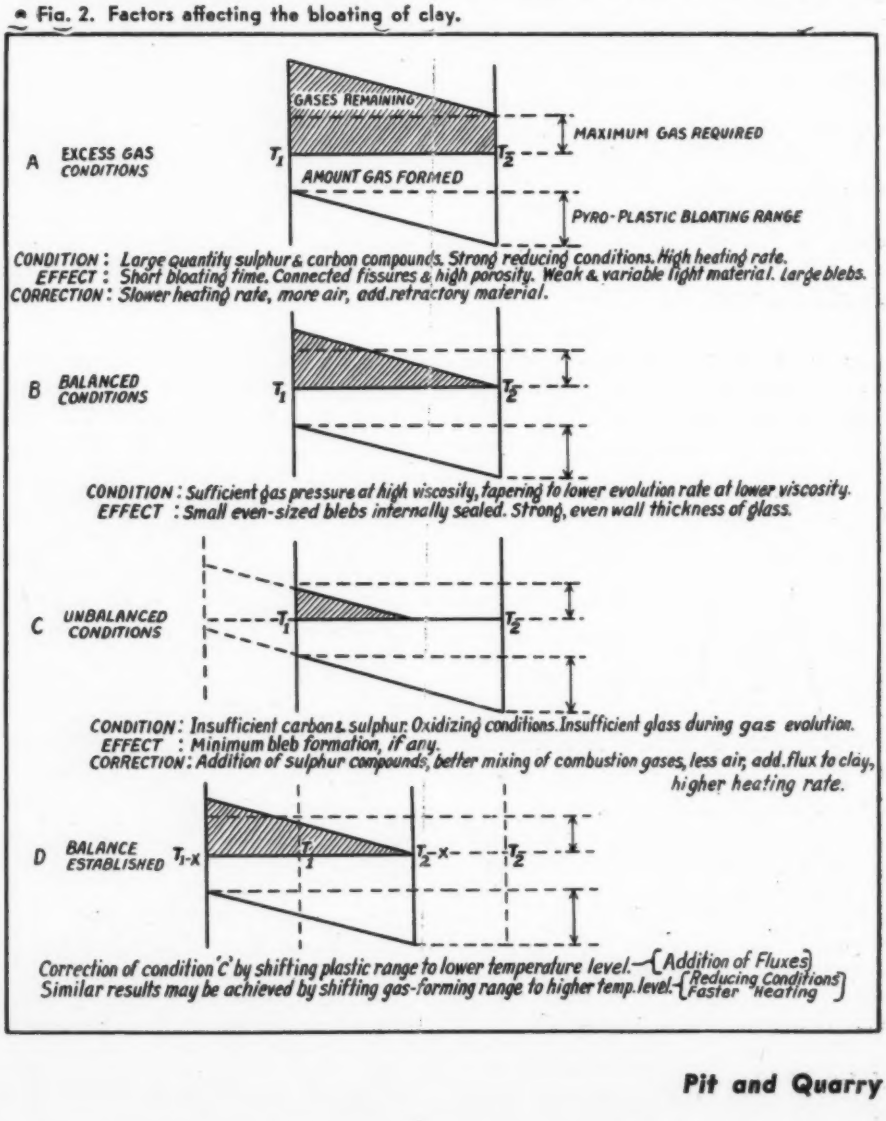
Raw Material Requirements In considering only clay or shale materials at this time some basic requirements may be laid down first. This will give us a better understanding and a basis for later discussions on the improvement of raw materials and processing techniques.

1. The material must develop sufficient glassy phase under heat to entrap evolving gases.
2. The material must contain gas-forming ingredients of sufficient quantity to bloat the glass so formed.
3. The gas-forming constituents must release a sufficient amount of their volatile constituents at an optimum rate, and at a temperature and time which coincides with the optimum pyro-plastic conditions of the clay.
4. At these optimum time-temperature glass-forming conditions, the glass must be of a viscosity which will allow formation of suitably-sized blebs or vesicules (for lowest density), and having bleb wall thicknesses that reflect in maximum glass strength.
5. The material should bloat into a vesicular structure at the lowest temperatures for reasons of process economics. On the other hand, such low temperatures must not be the result of alkali or salt flux action causing soluble salts to break down in the final concrete body.

Generally, at least one of these requirements is not fully met in actual practice. However, it is a short-sighted attitude on the part of the present or future manufacturer to consider mere duplication of bloating practice by others, when a ceramic testing study might reveal cheaper methods or superior results under certain conditions of processing. Methods and tools of investigation which have led to great improvements and advances in the glass, clay-products, pottery, glaze, enamel, and refractory divisions of silicate pyro-chemistry are also at our disposal in this expanded clay aggregate industry.

Constitution of Clay substance Clay may be defined as an unconsolidated earthy, more-or-less plastic material, com-

Fig. 2. Factors affecting the bloating of clay.


A EXCESS GAS CONDITIONS
GASES REMAINING
MAXIMUM GAS REQUIRED
T_1
T_2
AMOUNT GAS FORMED
PYRO-PLASTIC BLOATING RANGE
CONDITION : Large quantity sulphur & carbon compounds. Strong reducing conditions. High heating rate.
EFFECT : Short bloating time. Connected fissures & high porosity. Weak & variable light material. Large blebs.
CORRECTION : Slower heating rate, more air, add. refractory material.
B BALANCED CONDITIONS
T_1
T_2
CONDITION : Sufficient gas pressure at high viscosity, tapering to lower evolution rate at lower viscosity.
EFFECT : Small even-sized blebs internally sealed. Strong, even wall thickness of glass.
C UNBALANCED CONDITIONS
T_1
T_2
CONDITION : Insufficient carbon & sulphur. Oxidizing conditions. Insufficient glass during gas evolution.
EFFECT : Minimum bleb formation, if any.
CORRECTION : Addition of sulphur compounds, better mixing of combustion gases, less air, add. flux to clay, higher heating rate.
D BALANCE ESTABLISHED
T_{1-X}
T_1
T_{2-X}
T_2
Correction of condition 'C' by shifting plastic range to lower temperature level: {Addition of Fluxes / Reducing Conditions / Faster Heating}
Similar results may be achieved by shifting gas-forming range to higher temp. level.

posed of a number of loosely-held minerals, salts, and colloidal constituents derived from feldspathic parent rock, and composed, therefore, predominantly of alumina and silica. Shales are of similar composition chemically, but do not, as a rule, exhibit the plastic properties associated with most clays. In the latter the silicic acids and gels, as well as the colloidal and adsorbed water phases, are more pronounced. We shall not here go into the details of the origin and mineralogical compositions of clays and shales, except insofar as composition will affect the heat-expanding properties of the material.

Clays and shales usually, but not always, consist to a large degree of hydrous aluminum silicates. Alumina-silica-water may be present in the form of a mineral in the proportions of 1-2-2, 1-3-1, 1-2-3, and 1-4-1. Of these, kaolinite 1-2-2 ($Al_2O_3.2SiO_2.2H_2O$) is probably most common and best known. Along with kaolinite, the clay materials also contain certain accessory minerals and substances which, in the final analysis, determine the bloating and expanding characteristics of the clay and shale. Thus they contain certain amounts of pure or hydrous silica and quartz, unaltered feldspar and mica, alkalies such as sodium and potassium etc., free and hygroscopic (colloidal) water, chemical or molecular water (as in kaolinite), iron in the form of silicates, oxide, carbonate, hydroxide, or sulphides, calcium and magnesium carbonates and sulphates, and organic or carbonaceous matter in various forms.

It should be quite obvious that the pyrochemical reactions of a slay are not only those of kaolinite, but are very definitely modified by the interaction of these other "minor" ingredients. Since the manner and combinations in which the glass-forming and gas-forming substances in a clay determine, to a great extent, the temperature level and range at which reactions for bloating may take place, it should be further obvious that the chemical analysis of a clay or shale tells us only a small part of the possible behavior of the material.

In the low-temperature bloating range of clays, the flux elements and compounds of sodium, potassium, iron, calcium, magnesium, etc., are of predominant interest. So are also the gas-forming compounds of carbon, sulphur, and water. To some degree also, the state of division and distribution of some of these compounds will affect reaction rates and temperatures. (Finer grains and crystals will generally result in faster and lower temperature reactions during rapid heating rates.

Clay Heating Reactions The chemi-mechanics of the heat expansion, vesiculation, bleb forming or bloating of clays and shales is relatively easy to envision. However, the exact chemical processes initiating and promoting this action are less easily analyzed and proven. Since the sources and causes of the frothing action leading to the formation of natural lightweight materials (such as volcanic tuffs, pumice, pumicite, and the like) were quite different from those prevailing under clay bloating—as are also the mechanics of expansion of water-treated or quenched artificial slags—the present discussion will be aimed only toward the clay materials and their behavior under various heat treatments.

Although the initial stages and reactions of clay heating have no seemingly direct connection with the subsequent bloating phenomenon, yet these initial transformations of the clay substance at the lower temperatures may become of considerable importance in the final results. In any case they are well known, and will be touched briefly. The heating stages may be designated in approximate order of temperature rise as follows:

1. Mechanical moisture or drying period (removal of shrinkage and pore water).
2. Hygroscopic or colloidal water dehydration period.
3. Chemical or molecular water dehydration period (hydroxides, kaolin).
4. Oxidation period (iron, sulphur, carbon, etc.).
5. Dissociation-reduction period (calcium and magnesium carbonates, sulphates, ferric to ferrous oxide).
6. Vitrification period (first glass formation, mullite crystallization).
7. Pyroplastic condition (period of bloating in some clays).
8. Melting period (loss of structure and shape).

Most of these reaction periods overlap each other on the temperature-time scale, and can therefore not be designated as distinct stages of transformation. Some reactions take place in intermediate stages, such as the evolution of sulphur gases as dioxide or trioxide from the metal compounds, and their reabsorption by calcium, iron, alumina, sodium etc., through the water-soluble stage, which in turn causes a second dissociation at higher temperatures. In such furnaces and kilns as rotary kilns, such gas absorption and release can take place innumerable times, due to the relative direction and contacting of the moving material and gas streams.

Figure 1 was constructed as a diagrammatic illustration of the principal stages of gas-forming reactions in relation to the glass-forming reactions along the temperature scale. Each shale and clay will differ in the relative amounts of gas and glass formed, as indicated by the distance of the reaction peaks above or below the temperature scale line. The spread of the pyramids, however, represents the reaction ranges of each substance; these will be similar for the same constituents of different materials.

A number of factors in the commercial heat bloating of clay will change and shift the temperature ranges of gas evolution and glass formation to the right or left, depending on the atmospheric conditions (partial pressure ratios of the gases), fluxes present, heating rate, state of division, and kiln manipulation. Figure 2 is a simplified schematic illustration showing a few of the relationships, and demonstrating how they may affect the bloating process.

Agstone Production

(*From page* 70)

asked to participate in a meeting every Friday afternoon. Technology, costs and manufacturing are priority discussion subjects, and many extremely worth-while and useful points have been brought out in these gatherings.

A very extensive and detailed cost-accounting system set up by the company has already paid dividends in pointing out the high points on the cost graph. Other more subtle conclusions are constantly being reached.

Other officers, in addition to Mr. Deely and his son, are as follows: John Gaisford, chemist; Peter Comalli, Lee Plant superintendent; Dudley Woodbridge, superintendent of construction; Al Moser, Lee quarry superintendent; and Herman Naventi, superintendent of the West Stockbridge plant.

During the war years, the company contracted for the delivery of stone from its quarry to the crushing plant. It is of interest to note that this phase of the quarry operation costs were cut almost exactly in half when the firm took over this operation with its own personnel and equipment.

T. Jack Foster Elected First President Of New Pumice Producers Assn.

another ON THE SPOT report

REMARKABLE growth in the production and use of pumice as a lightweight aggregate in concrete is reflected in the recent formation of the Pumice Producers' Assn.

The organization meeting, attended by some of the country's leading pumice producers, was held

By HARRY F. UTLEY

on May 9 and 10 at the Biltmore Hotel, Los Angeles. Officers were elected as follows: president, T. Jack Foster, Pumice Aggregate Sales Corp., Albuquerque, N. M.; vice-president, Lloyd Williamson, Lloyd Williamson Pumice Co., Bend, Ore.; secretary-treasurer, Leonard Finch, Desert Materials Corp., Los Angeles.

The new officers will fomulate a set of by-laws to govern the group's future activities and will seek to establish uniform standards for the material, devise a program of tests, research, advertising and publicity, and arrange an interchange of valuable existing technical information among the producers.

Indicative of the architectural and engineering acceptance being accorded pumice aggregate, was the revelation that the three largest post-war commercial structures to be built in Los Angeles, used—or are using—pumice concrete exclusively! These height-limit structures were erected for the Pacific Telephone & Telegraph Co., the Prudential Insurance Co., and the General Petroleum Co. The pumice aggregate is providing the high strength demanded by the designers, yet the overall cost is reported to be lower than that of conventional concrete. In the case of the P. T. & T. Bldg., for example, the total cost of the structure was $1,600,000. Had sand-and-gravel aggregate been used in the concrete, the cost of the aggregate alone would have been $38,920. Actually, the pumice aggregate used cost $59,720. While the actual cost of the lightweight aggregate was, therefore, $20,800 more than for ordinary aggregate, the saving in total weight permitted 300 fewer tons of steel to be employed in the framing which, at $130 per ton, was a saving of $39,000. Thus, an overall saving of $18,200 resulted from the use of pumice aggregate while numerous advantages were gained, including high insulation in the walls and greater resistance to earthquake shock.

• Some of those attending the organization meeting of the Pumice Producers Assn. left to right, front row: Murray Erick; Mrs. Chas. M. Lane; Pres. T. Jack Foster; Mrs. Byron Ray; Dwight Roberts. Rear row: Chas. M. Lane; Jack Counts; Paul Laylander; S. M. Gregory; R. H. Cooley; Boris Kitchin; Lester V. Eaton; Paul R. Splane; Leonard Finch.

Guest speakers at the meeting included Paul E. Jeffers and Murray Erick, Los Angeles structural engineers, who have been prominent in the design of concrete buildings utilizing lightweight aggregates. Mr. Jeffers declared that pumice concrete may be priced $4 per cu. yd. higher than ordinary concrete and yet not become a "specialized" product. Any reduction in this plus-$4 factor will enable the material to make very rapid strides in popular acceptance, he opined. Mr. Erick gave the producers some interesting technical data regarding proper grading and saturation. By thoroughly saturating the pumice before charging the mixer, the porous nature of the material allows it to take up sufficient water to bring the specific gravity up to the point where there is no apparent segregation in the resulting concrete. On a pumice concrete pour on the Prudential Bldg., supervised and observed by Mr. Erick, slump was increased to 9½ in. and the concrete dropped 20 ft. without segregation.

• T. Jack Foster, President, Pumice Producers Association.

Chas. Wailes, president, and S. M. Gregory, chief engineer, Wailes-Bageman Co., Los Angeles, also spoke. This company is the largest concrete-block producer on the West Coast and uses pumice aggregates exclusively. It also batches pumice mixes into scores of ready-mixed concrete trucks for structural uses. Other guest speakers included Dwight Roberts, Smith-Emery Laboratories; and R. H. Cooley, Portland Cement Assn.

Charter members of the new organization, besides the officers already mentioned, include:

(*Continued on page* 116)

RECIRCULATING PACKHOUSE

Lone Star Cement's Design at Birmingham Sets New Standards

By WILLIAM M. AVERY

another ON THE SPOT report

NOTWITHSTANDING the cement industry's heavy preoccupation with production since the end of the war, a number of companies have undertaken and completed extensive and costly improvement programs, designed primarily to improve or guard the quality of their products. Packhouse facilities in particular are coming in for more attention (and more outlay of capital) than at any period in the industry's history, largely due to the development in recent years of a number of special types of cement for applications that weren't even dreamed of when most of the mills were designed. Many mills which were initially designed to produce only standard portland cement are today turning out air-entraining, high-early-strength, oil-well, masonry and other types in addition.

Among the more serious problems which accompany the handling of multiple types of cement is the danger of contaminating one type with another, either in the storage silos or in the packhouse itself. One of the most ingenious and effective solutions which we have seen to date has been worked out by the Lone Star Cement Corp. at its plants in Birmingham, Ala., Dallas, Tex., and Limedale, Ind. A few weeks ago we were privileged to inspect and photograph the company's recently completed packhouse at Birmingham, and we can say without reservation that Lone Star has set a new high standard in this phase of

Close-up of one of the 4-tube packers. Each of the plant's five packing machines has a 250 bbl. per hour capacity.

cement mill design.

Housed in a new and completely modern 3-story mill-type building adjacent and parallel to the old packhouse, the new packing plant has its own separate storage facilities, comprising 14 silos with a total capacity of 140,000 bbls. This capacity is in addition to the 160,000 bbls. which can be handled in the old silos. The latter, under normal conditions, will now be used for bulk loading through the old packhouse. A cross-over pumping system, however, makes the capacity of these silos also available for feeding the new packing plant.

The new silos, which have a capacity somewhat in excess of 10,000 bbls. each, are 101 ft. over-all in height and 26 ft. in inside diameter. The hazardous and costly work of cleaning out has been virtually eliminated by the installation of 100 percent conical bottoms, which permit the silos to empty themselves completely. The silos are arranged in two parallel lines on 27-ft. centers in both directions. The penthouses on top can be reached by means of an automatic passenger elevator, and there is also a cross-over bridge connecting the roof of the new bank of silos with the old. The new silos are equipped with bulk loading spouts, but under normal conditions their capacity will be used intirely to feed the packhouse.

Each line of 7 silos straddles a concrete tunnel which houses the tracks, spout connections and other appurtenant equipment for a 7-in. Type H2 Fuller-Kinyon portable pump. These pumps, as well as two stationary units installed to move cement from the old silos to the new or directly to the packhouse, are supplied with compressed air from a centrally located compressor station. Each of the four pumps is tied in with a Type C-250 Fuller rotary compressor supplying air at a maximum pressure of 37 p.s.i. The 125-hp. General Electric Type K induction motors which drive the compressors are interlocked with the pumps so that the compressors must be in operation before the pumps can be started.

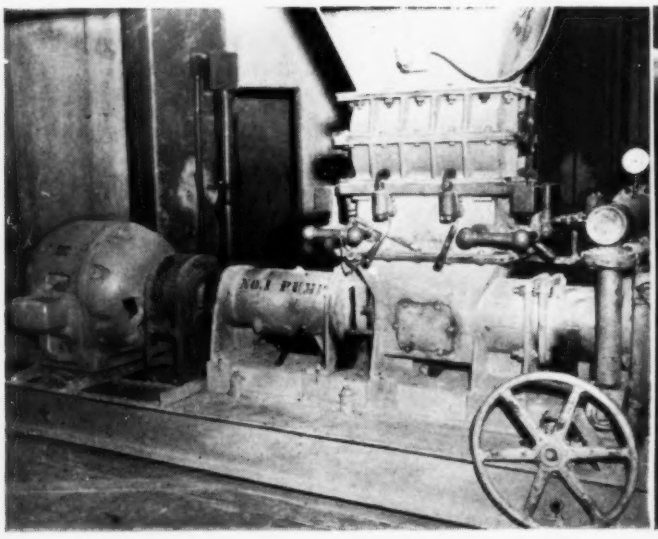
The building which houses both the compressor room and the packhouse proper is a reinforced concrete frame structure measuring 54 ft. in width by 188 ft. in length, with an 80 ft. addition at one end for the bag cleaning department. There are three operating levels in addition to a basement, in which certain controls, starters and screw conveyors are located. Rail sidings covered by canopies parallel both sides of the building and in addition there is a dead-end track which serves the baghouse alone.

There are four completely independent packing stations located on the main floor of the building. To render congestion and interference between the stations virtually impossible, the designers located the packers 45 ft. apart center to center. The No. 1 circuit contains two packers, one of which will be used exclusively for masonry cement, while each of the remaining three circuits incorporates just one packer. All five machines are St. Regis Type 150-FC 4-tube packers.

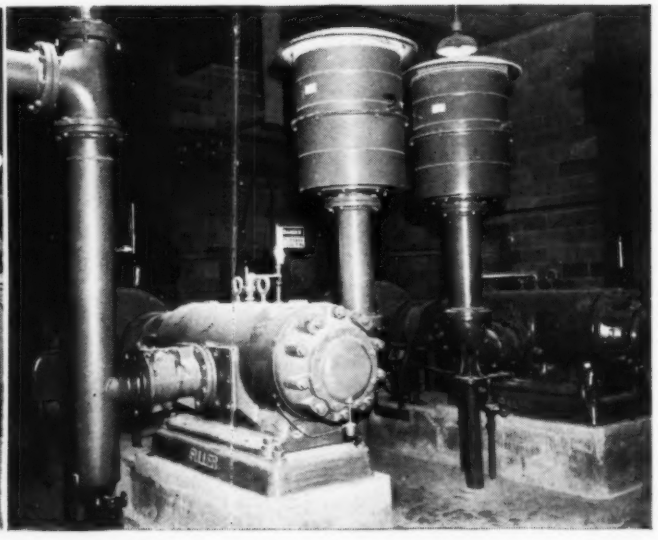
All four circuits in the packhouse utilize the Fuller-Kinyon completely automatic circulating system, which not only eliminates the danger of contamination but assures the delivery of cooler cement to the customer. Virtual control of the entire operation is maintained at the hose switching station on the main floor, at which point any one of the four Fuller-Kinyon pumps can be connected to any one of the four packing stations. An illuminated panel at this location shows at a glance precisely how the plant is hooked up at all times. This, in combination with the entensive use of interlocking controls throughout the plant, has resulted in what is considered a fool-proof packhouse, in which nothing at all is left to chance and only deliberate sabotage could bring about any very serious mishap. An incorrect hookup anywhere along the line automatically stops the entire system.

The flow in each of the packing circuits is as follows: The cement is pumped directly from the silo to a 5-ft. Fuller alleviator located on the second floor. This "arrests" the air from the Fuller-Kinyon pump, preventing it from entering the bins, screw conveyors, packers and other equipment units. The air-borne cement strikes baffle plates within the alleviator and falls directly into the conical spout below. A bifurcated valve at the base of the alleviator directs the flow into either of two 7-ft.-diameter circulating tanks located directly below. These have a capacity of about 75 bbls. each. High and low Bin-Dicators in the circulating tanks automatically control the operation of the Fuller-Kinyon pump which is feeding the circuit at any given time. The inclusion of two circulating tanks in each packing circuit (with the exception of No. 1) makes it possible to handle two different types of cement at each station, without the necessity of empty-

• Portable pump which operates on rails located in tunnel beneath one line of seven silos. Identical unit serves other line of silos.



• Four rotary compressors, one for each pump in the installation, are located in separate room between silos and packhouse.



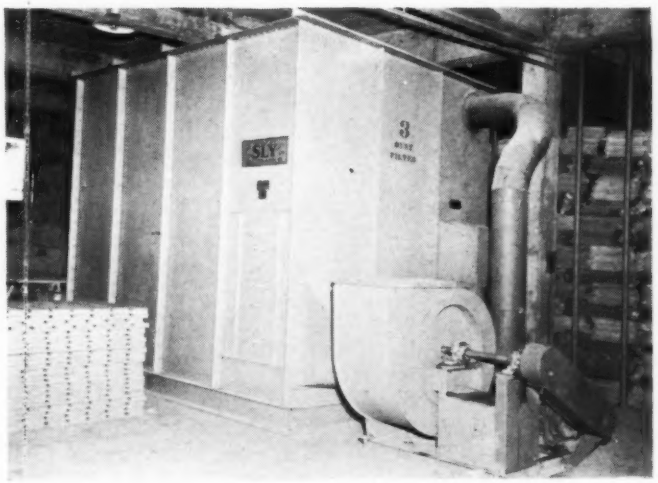
• Centrally located switching station for connecting any one of the four pumps with any of the packing stations.

ing and cleaning tanks to effect the changeover.

The conveying and elevating system is so arranged that spill, as well as circulated cement, is returned to the circulating bin in use, and complete changeover from one kind of cement to another can be accomplished in a minimum time and without danger of contamination.

A Fuller rotary feeder driven by a 3-hp. gearmotor feeds the cement from the particular tank in service to a 16-in.-diameter by 36-ft.-long screw conveyor located in the basement. The screw discharges into a double-chain cement elevator which returns the material to the second floor, where it is fed to a 30-in-diameter by 12-ft.-long fully-enclosed trommel screen. The purpose of screening at this point is primarily

• In the Birmingham plant, cement is pumped directly to 5-ft. elevators at packing stations. The purpose is to prevent air from entering bins, screw conveyors and packers.

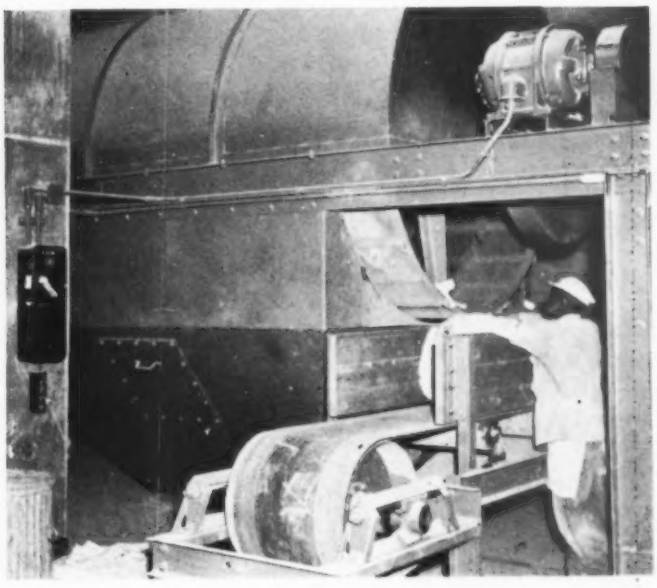


• Above: One of six dust filters which serve stations in the Lone Star packhouse.

• Above: Each circuit has fully-enclosed trommel screen to remove any debris present in cement.

• Below: Wire mesh conveyors below each packer deliver bagged product to car loading crews.

• Below: Cloth bags, returned by customers for credit, are cleaned in rotary drum. Cement recovered is returned to mill for regrinding.



• After cleaning, cloth bags are elevated to second floor for sorting as to type and condition.

to remove any debris introduced in the packing circuit.

The trommel discharges into a 16-in. by 29-ft. screw conveyor in which three 14-in. motorized rotary valves, located in the housing, feed the cement into the packer bin—or (if it is full) return it to whichever circulating tank is in use. Since the packer bin holds only about 35 bbls. of cement, the circulating system operates continuously, and the packer bin is both in fact and in theory full at all times. The system is so balanced that when the packer is operating at full capacity the actual circulating load is quite nominal.

Both the packer and the packer belt (a 30-in. by 36-ft. Cyclone wire mesh conveyor) are built over steel hoppers which return all spillage directly into the 16-in. screw conveyor located in the basement. In addition there are hoppers at each end of the conveyor for emptying damaged bags directly into the circulating system. The packer belt is reversible so that cars may be loaded on either side of the building.

The packers themselves are the latest type St. Regis 4-tube machines with a capacity of about 250 bbls. per hour each. All are mounted well above the first floor level of the plant so that there is full access to the mechanism not only from all sides but from below as well. Bags are fed to each platform from a sloping steel chute connecting with the second floor level. The chutes are divided in the center so that bags for two different types of cement (for example Incor and Lone Star) can be supplied at each station. Foot-operated trippers at the bottom of the chutes deliver the bags onto the platforms.

Incoming paper bags are received in the baghouse at the east end of the plant and elevated in bundles to the third floor. The 36-in. belt elevator used for this purpose handles 20 bundles per minute. Approximately 700,000 bags can be stored on the third floor of the building, and there is some additional storage space available on the second floor. Vertical steel chutes connect the third and second floor levels for transferring bags to the various packing stations.

Cloth bags returned by customers for credit are first thoroughly cleaned in a large rotary drum, then elevated and discharged onto a 30-in. by 36-ft. sorting belt located on the second floor. Here they are classified both as to type and condition, and those requiring repair work are routed to sewing machine operators on the same floor.

The packhouse at Birmingham is by all odds the cleanest we have seen anywhere in the cement industry, and we *have* seen a number that seemed remarkably clean, considering the nature of the material handled. Plainly the recirculating system in combination with the use of alleviators is an important forward step in the control of dust. All five packers and the bag-cleaning wheel in the new packhouse are served by individual 12-ft. Sly dust filters located on the third floor of the building. Each filter is connected to the alleviator and to the bucket elevator of the particular circulating system which it serves. The Type W Clarage fans on the filter units are stopped briefly every three or four hours, and a motor-operated rapper is run for about three minutes to dislodge the cement accumulated in the filter bags.

The recovered cement drops into steep hoppers under the filters, and is returned to the circulating systems in use by means of motorized rotary valves which feed the upper screw conveyors. Cement recovered in connection with the operation of the bag-cleaning wheel is returned to the finishing mill to be reground.

A vacuum cleaning system is also installed consisting of an Allen Billmyre unit, powered by a 15-hp. U. S. electric motor. This is piped to all the floors in the building to facilitate cleanup work.

Incorporated as part of the building design is a large glassed-in office for the packhouse foreman and the shipping clerks. It is centrally located on a balcony overlooking the first floor of the building, giving an unobstructed view of

• Damaged cloth bags go to repair station for mending on industrial-type sewing machines.

all four packing stations. Service rooms for the packing crew are located below. An underground tunnel connects the basement level of the new structure with the pump room which serves the old silos.

The new packing plant has about the same capacity as the old, and there has been little (if any) change in manpower requirements as a result of the installation. It has completely eliminated, of course, the crowded conditions which handicapped the old operation, and it will easily take care of any future increase in mill capacity.

The old packhouse will continue in service as a bulk loading station, and a Howe track scale has been installed for this purpose. Except under very unusual circumstances the new silos will be used only to feed the new packhouse, thus effecting a most desirable separation between the two handling methods. The old silos are still fed from the finishing mill department by means of bucket elevators and screw conveyors, but a Fuller-Kinyon pump has been installed to pump from the mill to the new silos.

A. D. Stancliff is general superintendent of Lone Star's Alabama Division, and John O'Callaghan is superintendent of the Birmingham plant. H. A. Williams, located at Birmingham, is chemist for the Division.

Desert Materials Corporation Successors to Paul R. Splane

Officials of the Desert Materials Corporation of Los Angeles, Calif., have announced their firm as successors to Paul R. Splane, Inc., in the ownership and operation of all pumice deposits formerly operated by Mr. Splane.

Application of Flame Photometer To Portland Cement Analysis

L. R. PRITCHARD
Chief Chemist, Lone Star Cement Corp.

THE great interest shown in the alkali content of Portland cement in the past few years has started many investigations on alkali volatilization in kilns and on alkali aggregate reactions taking place in concrete. This entailed a large number of difficult and tedious determinations of soda and potash which were not generally made in cement laboratories. The normal chemical precedures were set up, but it was well known that the making of these analyses was a difficult matter, requiring a sound knowledge of the chemistry involved and a high degree of analytical skill. Because of the great amount of time consumed in this determination, the results obtained were at times not applicable to plant control. For this reason, other methods of alkali analysis were investigated, among them the application of the flame photometer. The principle of flame photometry was not new, but the equipment had not been developed. Now the introduction of the Perkin-Elmer flame photometer Model 18A provided equipment which could be applied to this problem.

The flame photometer is an instrument for the rapid determination of sodium, potassium and other metals in solution. It is designed to measure quantitatively the light emitted by various metals when they are excited to spectral emission in a flame. Since the intensity of the light emitted by each element depends primarily on the concentration of its atoms in the flame at any given instant a measurement of the light intensity produced by a given element makes possible the quantitative determination of that element.

The Model 18A flame photometer proved very useful for plant control tests of alkalies. The photometer was standardized, using portland cement of known alkali content as a basic standard. There was no cement sample put out by the Bureau of Standards of known alkali content which could be used as a standard; so a cement was selected which had been analyzed by several laboratories, and the average results were accepted as the correct value of soda and potash. By using various amounts of this cement, a calibration curve was established for Na_2O and K_2O at concentrations of 0-100 p.p.m. A cement was used as a standard instead of pure compounds because (1) it was difficut to get pure compounds; (2) small errors in using a cement would not affect the alkali content used as much as small errors in using pure compounds; (3) time was not available to study the effect of interfering elements, viscosities of solutions, etc. If we wanted to make only cement analyses, the results obtained by this method at least would be comparable to the basic standard.

• Flame photometer at work in a cement laboratory.

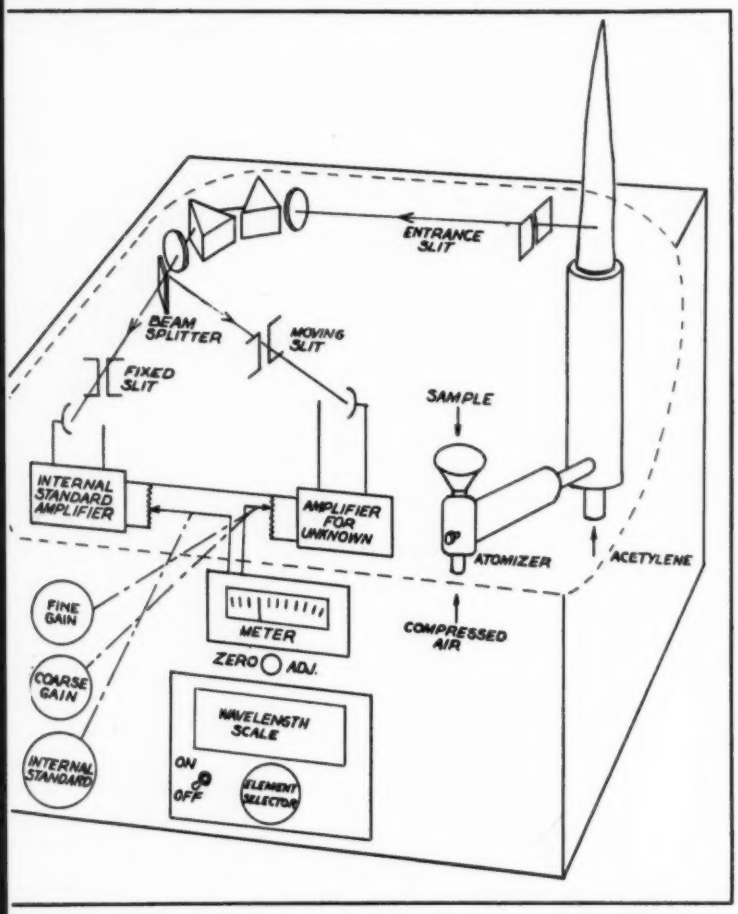
The results we obtained on this Model 18A flame photometer were very satisfactory and encouraging. For example: An alkali determination could be made in 10 minutes, including the time of weighing, dissolving a sample and running it in the flame photometer. The sample was prepared by taking one gram of cement or clinker and dissolving it in 5 ml. of HCl in 25 ml. distilled water. This solution was filtered into a 100-cc. volumetric flask and diluted to volume with distilled water. The flame photometer was balanced, 50 mls. of solution were poured into a 100-cc. beaker and placed under the atomizer. The needle was brought to balance with the ratio dial and the concentration of Na_2O and K_2O in p.p.m. was read from the calibration curve. The atomizer tube was then washed out with distilled water, the zero point checked and then the instrument was ready for another determination. The work was done as quickly as these printed words can be read.

The results in Table I indicate the accuracy obtained with this Model 18A flame photometer. Each individual chemical determination is the average of 15 analyses made by 15 different laboratories. Each flame photometer result is the average of two determinations made by the same operator on the same sample.

Table I

Sample	Chemical Analyses			Flame Photometer		
	Na_2O	K_2O	*T-Alk.	Na_2O	K_2O	*T-Alk.
1	.34	.51	.68	.28	.58	.66
2	.33	.50	.66	.25	.61	.65
3	.22	.57	.60	.18	.86	.75
4	.69	.22	.83	.69	.22	.83
5	.20	.27	.38	.22	.22	.36
6	.32	.76	.82	.21	.71	.68
7	.21	.50	.54	.20	.50	.54
8	.32	.49	.64	.32	.42	.60
9	.28	.62	.69	.21	.66	.69
10	.50	.29	.69	.50	.24	.66
11	.46	.36	.70	.36	.40	.62
12	.30	.32	.51	.25	.40	.51
13	.15	.59	.54	.14	.81	.67
14	.28	.25	.44	.27	.15	.37
15	.32	.55	.68	.30	.61	.70
Avg.	.33	.45	.63	.29	.49	.61

*T — Alk = Na_2O % + .658 K_2O %.



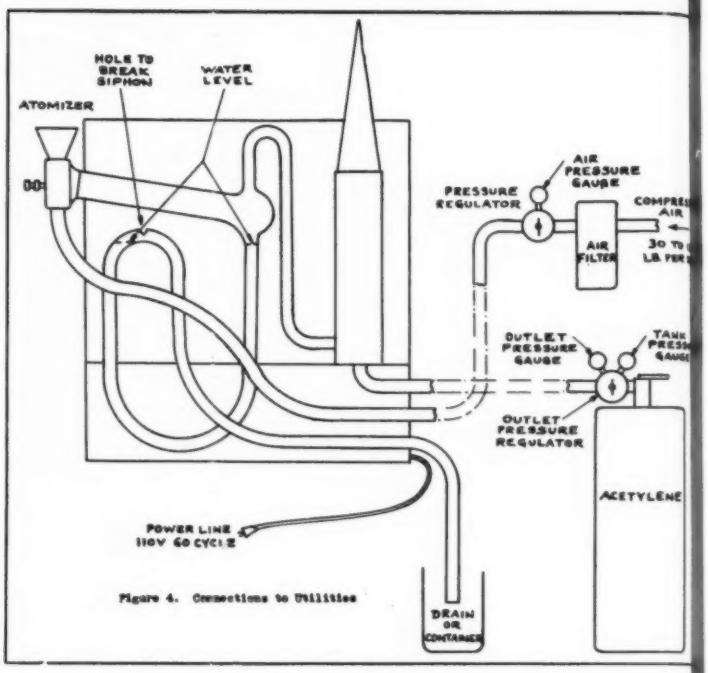


Figure 4. Connections to Utilities

• Above: Fig. 4. Line diagram showing connections of photometer to utilities.

• Left: Fig. 2. Schematic diagram of the flame photometer.

These results indicated the possibilities of this instrument. The time saved meant that even with limited accuracy this equipment could be used on plant control work.

Within ten months, the Perkin-Elmer Company had improved and modified this flame photometer and were manufacturing a Model 52A. This instrument had a much wider application; and accurate analyses for solutions of sodium, lithium, potassium, magnesium, calcium, strontium, barium, chromium and manganese could be made. This paper will be confined to the determination of Na_2O and K_2O in Portland cement.

Figure 1 is a photograph of the Model 52A flame photometer. This gives an idea of its relative size and compactness. Figure 2 is a schematic diagram. A description of this instrument is as follows:

"The Perkin-Elmer Flame Photometer, Model 52A, is an emission spectrometer combined with a flame source and a photo-electric detection system for the measurement of light intensity. The arrangement of parts is illustrated schematically in Figure 2. Liquid samples are introduced through a glass funnel above a stainless steel atomizer mounted on the upper right hand corner of the front panel. The atomized sample is blown into a glass atomizing chamber and thence into the base of a special burner. Within the chamber the larger liquid particles settle on the walls and run out the drain. Attached to the atomizer is a small baffle which deflects the atomized spray against the walls, helping to throw out the coarser droplets. The liquid going through the drain forms a liquid trap to maintain a uniform pressure to the burner, and to prevent the escape of air through the drain tube. The finer particles, in the form of a fog, are carried in the air stream to the burner, where they are mixed with gas and burned in the flame.

"The burner is situated directly behind the atomizer and chamber in the right rear corner of the instrument. Its stainless steel construction renders it inert to the chemical action of most types of samples. The standard burner has a jet and grid designed to burn air and acetylene and will not operate satifactorily on any other fuel. A separate burner, however, may be obtained for use with propane and air.

"Heat is removed from the instrument by a conical aluminum chimney which reflects it upward and outward. Additional insulation and stability for the flame is provided by a glass chimney surrounding the flame. The instrument may be operated without the reflector and chimney for limited periods, and both must be removed for lighting the burner or inspection of the flame.

"The entrance slit of a two-prism monochromator faces the center of the flame just above the grid of the burner. Light from the flame passes through the monochromator, where it is dispersed into a spectrum, and then divided into two parts by a beam-splitting mirror. One beam falls on a movable slit that can be set to any point in the spectrum while the other falls on a fixed slit, set to allow only the light from the element lithium to pass.

"The photo-electric system of the flame protometer is designed to perform either of two functions. It may be used as a simple amplifier for the direct measurement of the light intensity on the phototube behind the moving or scanning slit, or it may serve as a potentiometer for measuring the ratio of the light intensity on the scanning phototube and the intensity of light on the phototube behind one fixed slit. In other words, the photometer makes possible the measurement of the light intensity produced by a single element being determined; or it may measure the ratio of light intensities produced by the element being determined to that of the added interval standard element, lithium.

"The outputs from the two phototubes are amplified separately and led to potentiometer-type attenuators mounted on the front panel. The attenuator associated with the moving exit slit serves as an over-all gain control to fix the instrument's range and sensitivity. Coarse and fine adjustments are provided. The output of the amplifier associated with the internal standard (fixed slit at the lithium wave-length) phototube can be attenuated from 100 to 0 percent by turning the internal standard dial from 0 to 100 on the scale. The outputs of the two attenuators after another stage of amplification are connected in opposition, so that either may be read directly when the other is set to the end of its range, or the two may be exactly balanced against each other by using the output meter as a null indicator.

"As a direct-reading photometer, the internal standard dial is set at zero. For use as a ratio photometer to compare the light falling on the internal standard cell with that falling on the other, the internal standard dial is adjusted until its signal exactly balances that of the unknown.

"The main amplifier, not shown in Figure 2, is located in the lower left hand side, directly behind the electrical controls. It contains the power supply and two additional stages of amplification that make the signals large enough to be read on a rugged milliammeter. The remaining electrical control on the panel, the zero adjusting knob, serves only to supply a small additional current to the indicating meter so that balance at the desired point on the scale of the meter may be achieved.

"Other features not shown in Figure 2 are the connection from the element selector and wave-length scale to the moving slit for setting the slit to the emission lines of the different elements, and the rotating sector shutter and synchronous rectifier needed for a.-c. amplification. The latter, located just behind the entrance slit of the monochromator, gives an extremely steady output signal free from effects of dark currents and zero drift."

The utilities required are: (1) 4 to 6 feet of laboratory bench space, or a table with a drain; (2) compressed air at a pressure of 30 to 150 p. s. i.; (3) alternating current electricity at 110 volts, 60 cycles; (4) acetylene or propane gas in tanks, depending on the burner used. Figure 4 illustrates the connections to the utilities which are very important.

Table II. Comparison of Determinations of Na_2O and K_2O in Portland Cement

Sample Number	Gravimentric*		Flame Photometer**		Difference	
	% Na_2O	% K_2O	% Na_2O	% K_2O	% Na_2O	% K_2O
1	.30	.25	.33	.22	+ .03	— .03
2	.06	1.06	.04	1.15	— .02	+ .09
3	.08	.30	.06	.35	— .02	+ .05
4	.15	.54	.14	.58	— .01	+ .04
5	.91	.36	1.16	.37	+ .25	+ .01
6	.46	.18	.53	.20	+ .07	+ .02
7	.40	.19	.44	.20	+ .04	+ .01
8	.37	.17	.44	.19	+ .07	+ .02
9	.38	.18	.44	.19	+ .06	+ .01

*Samples numbered 1 through 5 by A.S.T.M. Standard Method. Samples numbered 6 through 9 by A.S.T.M. Alternate Method. (Gravimetric results were submitted by W. C. Hanna, chairman, A.S.T.M. Working Committee on Methods of Chemical Analysis).

**Sample averages of three determinations made on Perkin-Elmer flame photometer.

The sensitivity with a propane flame for sodium, lithium and potassium is comparable to that for the acetylene flame. The red-sensitive phototube is suitable for sodium, lithium and potassium, so that it is possible to determine soda and potash without changing tubes. The flame photometer is a relative instrument; it must be standardized by calibrating with solutions containing known concentrations of the elements to be determined. The output meter of the instrument reads proportionately to the intensity of light emitted by the sample put into it; therefore, it is necessary to convert the meter readings, (or ratio readings) into terms of concentrations most convenient to the analyst. There are several variables, such as air pressure to the atomizer, gas pressure to the burner, chemical composition of a sample, sample viscosity, etc., which are impossible to eliminate. It has been found that the "internal standard" method of operation which compares the light of the element to be determined directly to the light emitted by the element lithium, causes smaller errors in the results obtained. This is considered one of the main advantages of the Model 52A over the Model 18 A flame photometer. The Model 52A was standardized using lithium nitrate, CP soda, CP potash, and CP calcium carbonate to prepare standard solutions of various concentrations. Standardization curves were developed for Na_2O and K_2O of concentrations varying from 0 to 100 p.p.M. All determinations referred to in Table II were made by the "internal standard" method. 10 ml, of solution containing 1000 p.p.m. of the element lithium were added to each sample as the "internal standard" (9.94 grams lithium nitrate per liter). Cement samples were brought into solution in the same manner as for SO_3 determination. (See A.S.T.M. Manual). The solution was then filtered into a 100-ml. volumetric flask and after addition of the "internal standard" made up to a final volume of 100 cc. The solution is poured into the atomizer, the instrument balanced with the internal standard dial. Then the standard solution is added to the atomizer and the meter balanced again with the internal standard dial; the balance positions are recorded; check readings are obtained; and then the average values are converted to concentrations by means of a calibration curve. The percentages of soda and potash are obtained in a few minutes instead of two days by the gravimetric method.

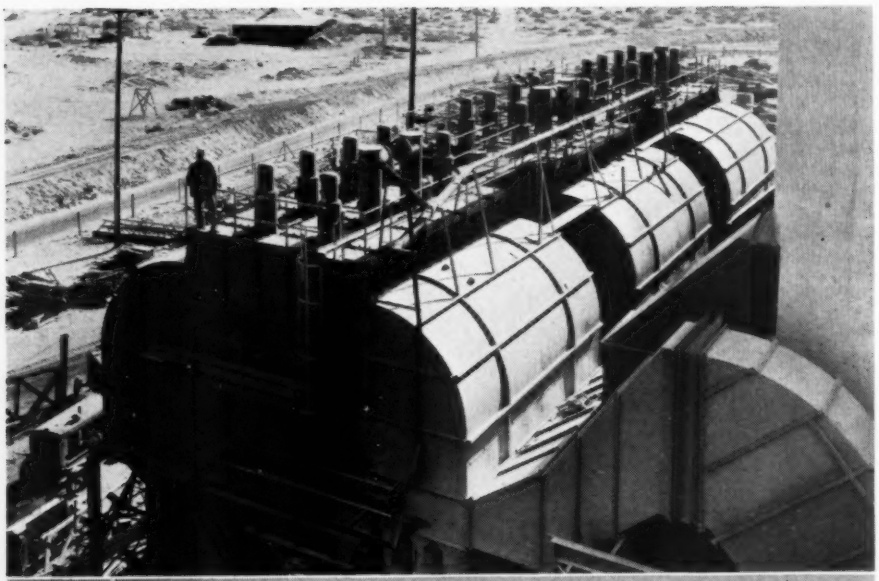
The performance of flame photometer Model 52A depends, to a large extent, on the skill and ingenuity of the operator. It is not an apparatus into which you can pour a solution containing unknown elements, turn a dial and get a complete analysis. If skillfully and intelligently used, it is a very useful tool for the determination of alkalies in portland cement, saving a tremendous amount of analytical time. After the instrument has been carefully standardized and the operating technique developed, it can be operated by a laboratory technician, thus saving the time of an analytical chemist. It has many applications in water analyses and it has possibilities in quick determinations of calcium, magnesium and barium which are related determinations in the production of portland cement. It is hoped that these applications will be investigated and the results obtained reported in a future issue.

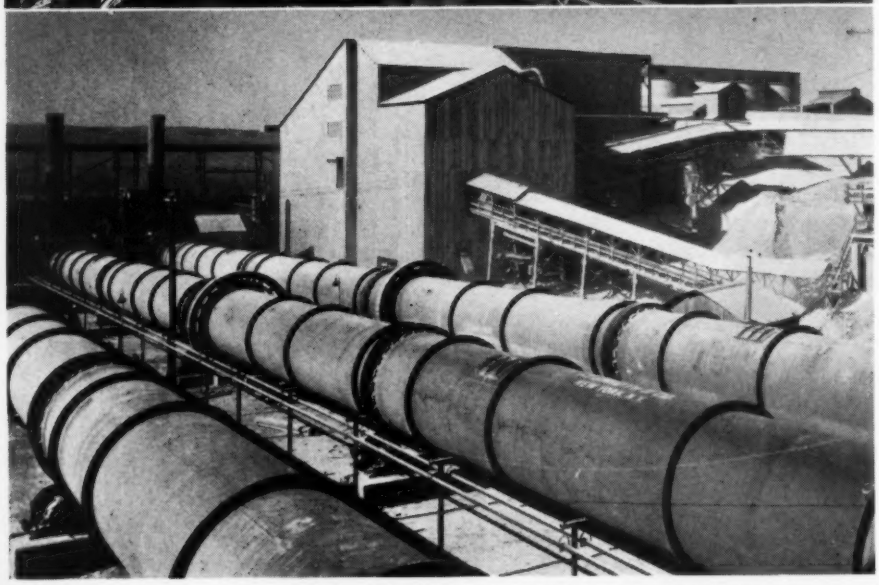
Ben Bahnsen Sr. headed the list of honorees at the dinner held recently for 65 United States Gypsum Company employees. Mr. Bahnsen had been with the firm for 46 years.

Others with high scores were Steve Rosiar (45 years), William Mardsden (43 years) and John Hudev (40 years). Those having service records of more than 25 years were presented with watches.

Riverside Looks To The Future

Oro Grande Cement Plant Completely Rebuilt





Top: Looking down on the three dust collectors from the top of the kiln-feed silo.
Bottom: The three new 350-ft. kilns with crusher house in background.

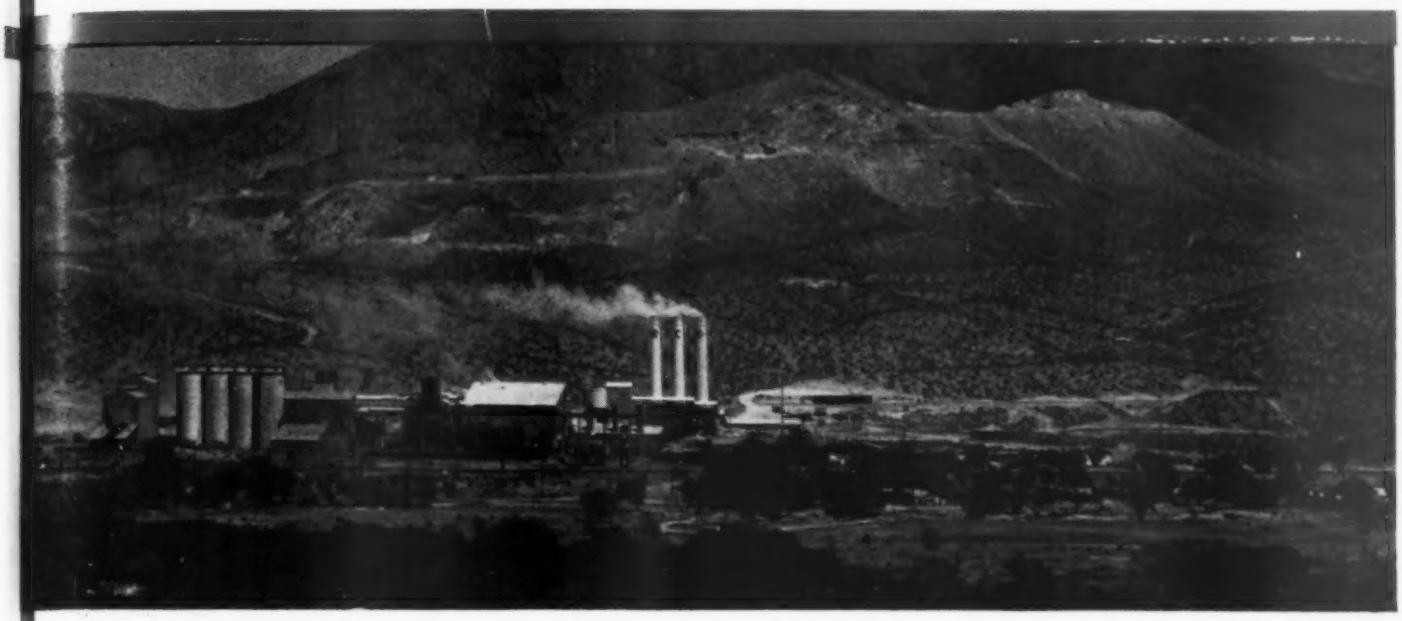
another ON THE SPOT report

WITHIN the last two years, the Oro Grande, Calif., plant of the Riverside Cement Company has been undergoing a complete rebuilding and modernization program, highlighted by the installation of three new kilns—each 10 ft. in diameter and 350 ft. long — the largest dry-process cement kilns in the world.

By Harry F. Utley

The new kilns and appurtenant equipment provide production capacity of 2,500,000 barrels annually, as compared with a former capacity of 1,00,000 bbl. The five old kilns, 10- by 8- by 125-ft. in size, remain operative and by Fall additional raw-grinding capacity will permit their operation, increasing plant capacity to approximately 3,500,000 bbl. of cement annually.

The original plant at Oro Grande, located a few miles north of Victorville, Calif., on the rim of the Mojave Desert, was built with British capital about 1912 and was purchased by Riverside in 1923 and enlarged somewhat during the middle twenties. When building volume tapered off, production was curtailed, and in 1928 the plant was shut down entirely, to remain out of production for 14 years. With the demand occasioned by the advent of World War II, the Oro Grande plant was re-opened at the request of the War Production Board. The finish end had by this time become obsolete, due to rapid strides during the intervening years in production techniques; and, for a year or so, Oro Grande merely produced clinker, which was shipped to Riverside's other plant at Crest-



General view of the Oro Grande plant as seen from vantage point west of the Mojave River. Quarry is on hill at upper right.

more, Calif., for grinding. As an acute car shortage developed, the W.P.B. issued the necessary priorities to re-vamp the finish-grinding end to permit complete production. This was accomplished in 1944.

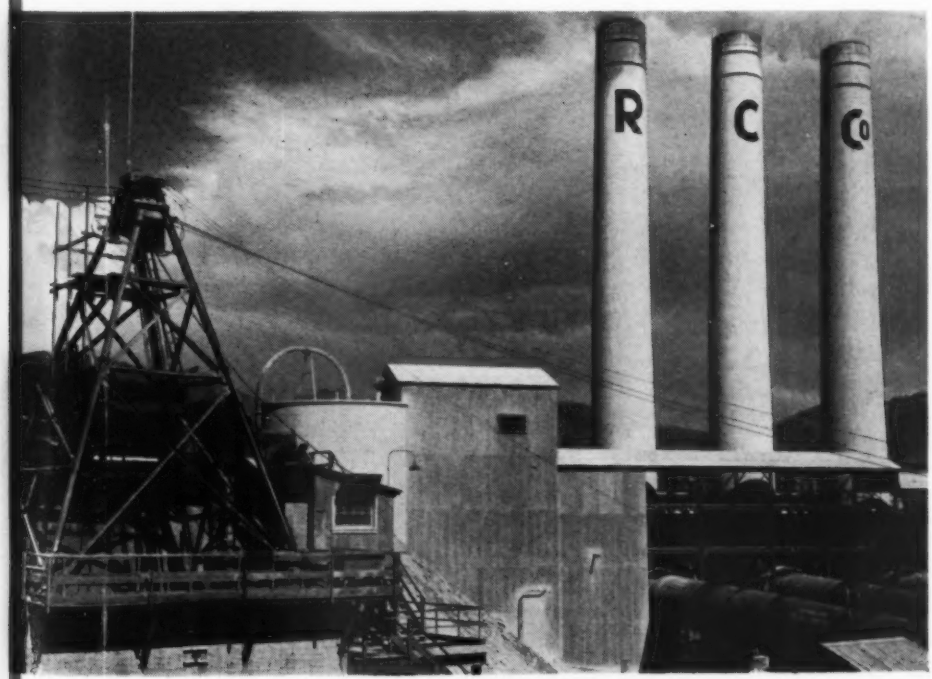
Shortly after the end of the war, a Civilian Production Administration (successor to WPB) survey indicated a possible shortage of cement-producing capacity in southern California in the face of an accelerated housing program, and it arranged top CPA priorities to enable the rapid re-building of the entire Oro Grande operation. This was started in 1946 and is now nearing completion.

The job is a tribute to the teamwork which can develop in this country when a critical situation arises. Riverside managed the project and financed it; the various governmental agencies cleared the track to enable the procurement of the necessary equipment and materials; southern California has benefited by an overall 25 percent gain in cement-manufacturing capacity.

Today, the Oro Grande plant has the "new look"; is completely modern from quarry to packhouse. Man-hours of labor per barrel of cement ground are considerably lower, and the new kilns with their heat recuperators are certain to show savings in fuel consumption when operating figures become available. (Fuel oil, which formerly cost 60c per barrel, now costs $2.15, f.o.b. refineries.)

The raw material deposit is located about two miles, and uphill, from the plant, and the stone is quarried on 25-ft. benches for selectivity and as a safety measure. Drilling is done entirely with Ingersoll-Rand wagon drills. The high-calcium limestone occurs as pendants above the granitic hills, as is typical of the area; and shots are detonated every four or five days, usually about the time the afternoon shift changes, volume per blast running in the neighborhood of 10,000 tons. A four-component raw mix is used at Oro Grande; shale and quartzite are available on the deposit and iron ore is shipped in.

Two new Marion 492 electric shovels, handling 2½-cu. yd. buckets, load the stone into four special delivery units. These consist of Autocar 200-hp. Cummins diesel tractors with Timken 472 dual-differential tandem rear ends. Each tractor pulls a Fruehauf side-dumping double-body semi-trailer of 40-ton capacity. With the load sharply down-grade all the way, (elevation at the plant is 3,000 ft.; at the quarry 3,300 ft.) 90 percent of the braking effort (and a like percentage in the cost of brake re-lining) has been saved by the installation on each unit of a "Hydrotarder" to retard the speed of the truck. By setting a control valve in the cab of the tractor, the driver can regulate the down-hill speed as desired.



Derrick above primary crusher. Kiln feed building and 150-ft. stacks at right.

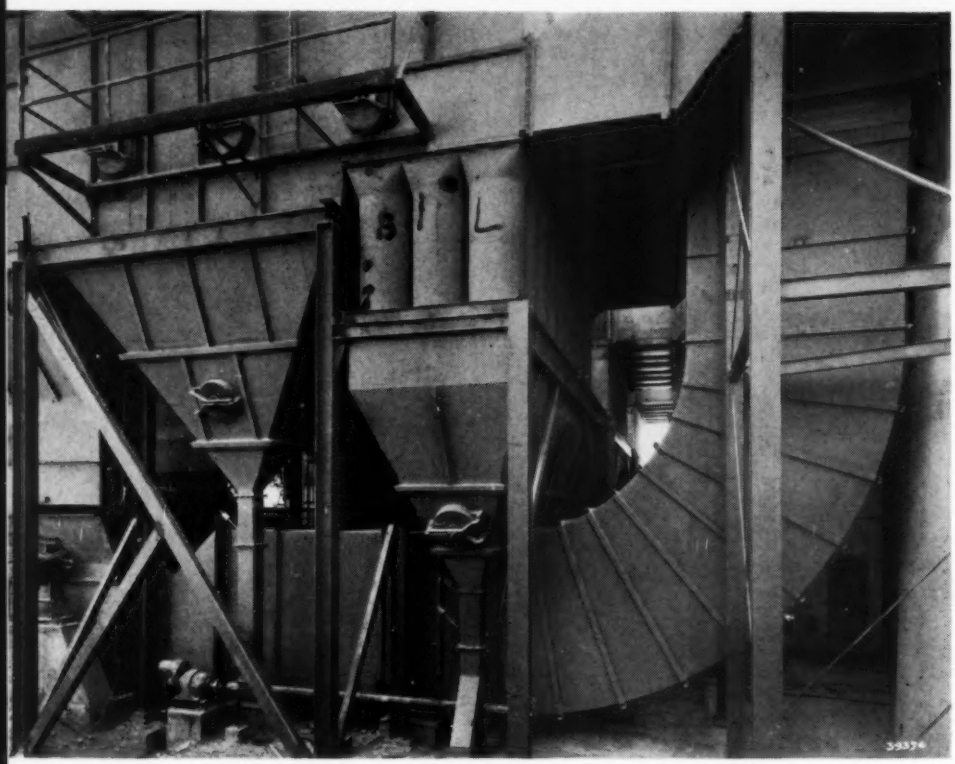
Frictional heat developed in retardation of the load is dispersed in the form of steam, the hydraulic medium in the turbo-retarder being water.

The loaded tractor-trailers discharge at the plant to a receiving bin, where a Jeffrey vibrating feeder conveys the rock into an Allis-Chalmers 48- by 60-inch jaw crusher set to break at about 5 in. A 200-hp. G.E. motor drives the primary crusher. The product of the jaws goes by conveyor to a 5½-ft. Symons cone crusher which breaks to about minus 2-in. output, passing by inclined and overhead tripper-equipped conveyor to a storage pile. A reclaiming belt in a tunnel beneath the pile carries the rock to a pair of 4-ft. Symons short-head cones for the third stage of crushing, reducing the material to minus ½-in. before going to a pair of 200-ton concrete storage bins. Over-size from the short heads is scalped off and returned for re-crushing by a pair of Symons vibrating screens in closed circuit.

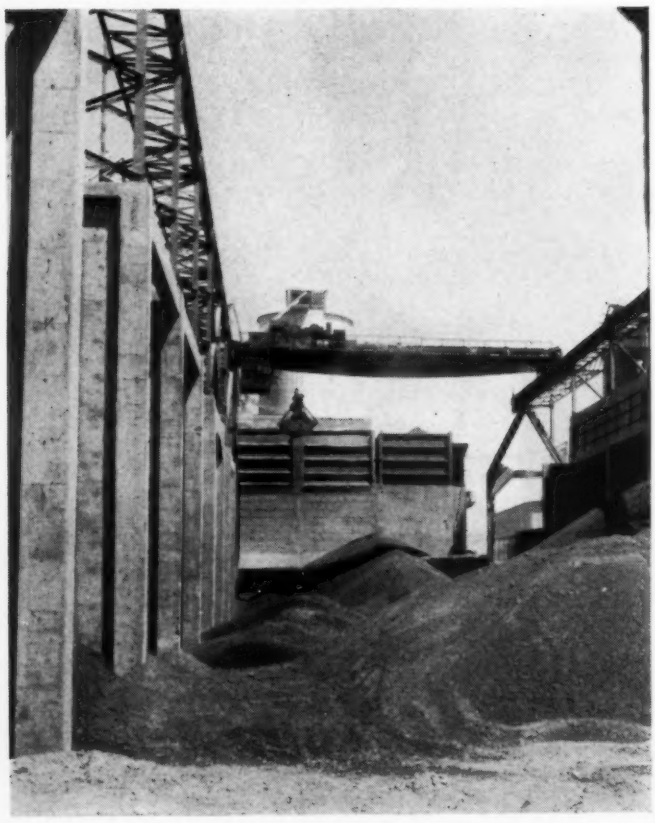
From the crushed-storage bins, a set of Waytrol automatic feeders feeds the limestone and shale separately to screw conveyors which load the raw mills.

Raw grinding is a single-stage closed-circuit procedure, the operation being accomplished by three Smidth 9½- by 18-ft. 8-in. Tirax air-swept ball mills fed from the conveyors by three Waytrol feeders. The third mill is just being installed. The desert area is usually dry, but during certain seasons excessive moisture occurs. Provision for drying of raw materials has been made by installation of Coen hot-air furnaces ahead of the mills. This is said to be the first application of Tirax mills to this type of grinding, and the management is reported to be highly pleased with performances to date.

The mills are driven by E.M. 800-hp. synchronous motors with across-the-line starting. The mills are slide-shoe mounted and gear-driven. Automatic control of the feed is attained by a spring-contact "finger" which is in constant tension against a section ring machined circumferentially around the feed end of the mill. As the intensity of shell vibration varies with the

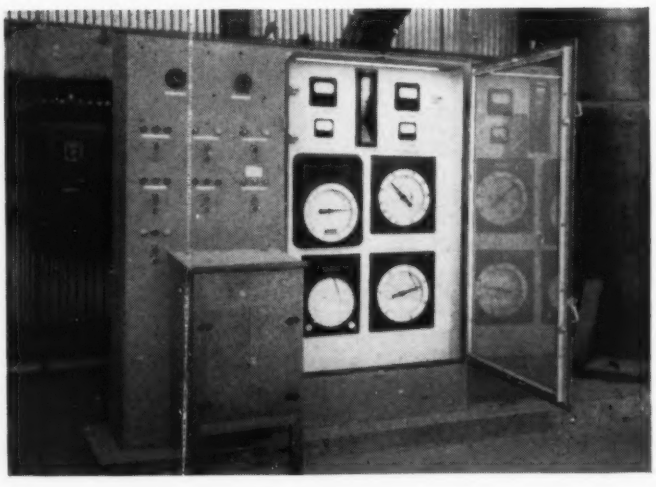


• View of the combined Multiclone-electrical precipitator dust collector installed on the kilns, showing dust return piping and fan ducts.



• The new clinker storage has a capacity of a quarter-million barrels. The overhead crane handles a 4-cu.-yd. clamshell bucket.

• Combination instrument panel-control board on one of the kilns. There are three such panels on firing floor.



• One of the grate-type cooler-recuperators with primary air fan to kilns at left.

• Two steel pressure tanks are inter-connected with raw blending silos at left.

load within the mill, the "finger" feels the changing impulses and transmits them electronically to the sensitive feed-belt regulators of the Waytrol automatic feeder, speeding or slowing the feed in proportion to the mill load.

Fines are removed from the circulating load in the mills by Smidth air separators. Two 9VG Multiclones, in series, are also in the circuit for auxiliary use and operate as additional control units whenever the raw material is relatively high in moisture content, necessitating the use of an excess of air through the mills and classification circuits. Kiln-feed fines are transported by Fuller-Kinyon pumps and pipeline to the raw-storage silos.

The raw silos, with a combined capacity of 6,700 tons and all interconnected, consist of three conventional blending units of reinforced concrete construction arranged in line, and two steel pressure silos, or tanks. Air under 20-lb. pressure is introduced through the bottoms of the tanks, which are fitted with porous metal blocks to facilitate aeration, homogenization and blending of the raw feed, as well as to drive the pulverent material through an 800-ft. pipeline to the 100-ton kiln-feed silo.

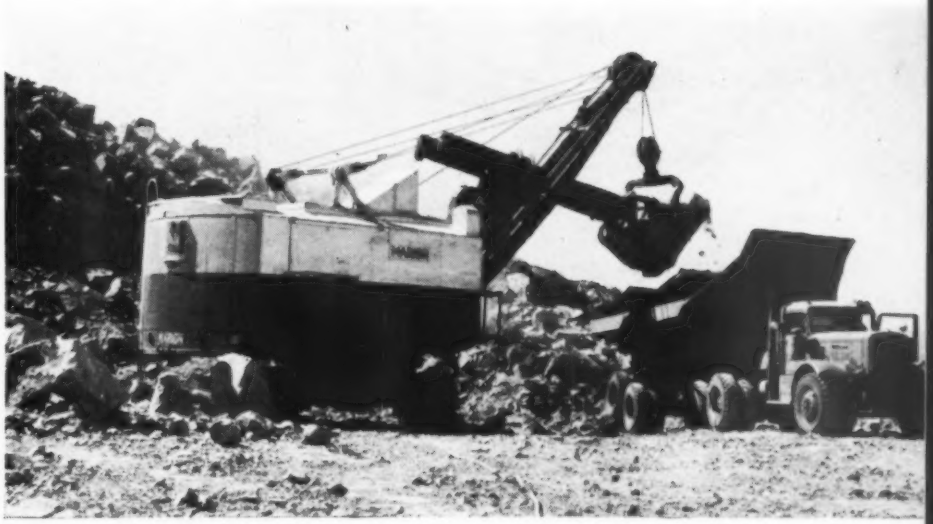
The raw material is withdrawn from the feed silo by three screws which discharge to a pair of enclosed bucket elevators, the elevators in turn feeding two screw-conveyor lines which supply the feed screws serving the three kilns. Feed regulation is under the control of the operator on the burning floor nearly 400 feet away.

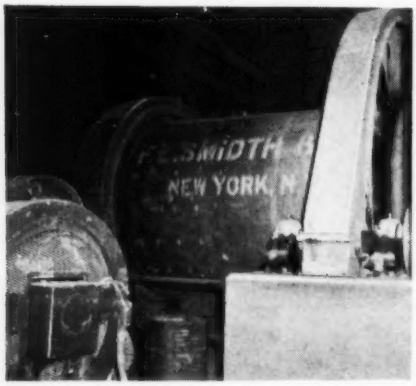
The new Smidth kilns are unusual only perhaps because of their size—10 ft. inside diameter by 350 ft. in length—the longest burning units ever to be installed to calcine cement clinker by the dry process. They slope 7/16 in. per ft., only slightly less than for similar kilns burning by the wet process. They are all-welded tubes and were engineered by F. L. Smidth & Co. and fabricated under Smidth supervision in the Los Angeles plant of the Consolidated Steel Co. Each has five tires with 14-in. faces turning on water-cooled trunnions. The drive is by 100-hp. d.-c. Reliance electric motor through Philadelphia gear reducer and Falk couplings. In the event of power failure, stand-by power to keep the kilns turning is provided by the installation of 75-hp. International gasoline engines at each drive position. Normal kiln speed is 70 r.p.h. in synchronization with the kiln-feed rate.

For their entire length, the kilns are lined with 6-in. arch-type refractory brick, about 50,000 units being used per kiln. For about 300 feet at the feed end, 40- and 50 percent alumina brick are used; the 40-ft. burning zone utilizes 70 percent alumina brick; and the final 15 feet at the discharge end is lined with 50 percent alumina brick.

The kilns are producing about 2,200 bbl. of clinker per day each,

• One of the 2½ cu. yd. electric shovels loading double-body semi-trailer in the quarry.





• Top left: One of the four Tirax ball mills. Three operate as compartment mills in the raw end and one as a preliminary clinker grinder.
• Top right: Skipulter shaker-conveyor which discharges clinker to Stephens-Adamson pivoted-bucket carrier.
• Bottom left: Close-up of Hydrotarder on quarry truck which retards truck speeds on two-mile downhill haul to plant.

without surges and with extremely low dust loss, gases being drawn through specially-built combination Multiclone-electrical precipitator collectors and exhausting through three 150-foot Rust Engineering Co. stacks. Buffalo induced-draft fans are employed on each kiln to draw the gases through the collectors.

The dust collection system on the kilns was engineered by the Western Precipitation Co. and is designated as a CMP (combined Multiclone precipitator) installation. It consists of three 24VD vane-type 30-tube Multiclones preceding and integral with three extremely compact 27-duct Cottrell electrical precipitators of a new type. The system is designed to remove at least 95 percent of the dust. Electrical equipment for the precipitators is housed in a separate substation building and consists of the necessary switchboard and one 25-kv.a. transformer and one full-wave rectifier for each Cottrell.

High-pressure fuel oil is atomized and burned by Coen burners. Hoods are bricked in. The oil comes in by both rail and truck and is pumped to storage in an elevated tank, returning by gravity. Control boards, one for each kiln, consolidate all instruments, switches, and regulatory devices at convenient central points on the burning floor.

Clinker drops to three Fuller 5- by 20-ft. air-quenching inclined grate coolers, or recuperators. In this instance, however, this equipment was installed primarily for its heat recuperative ability, and the units are therefore considerably smaller than they would be were they expected to do a complete cooling job. Heat is returned from the grates to the kiln at a temperature of about 1,300 deg. F. in the form of secondary air.

The grate recuperators feed the clinker to a skipulter shaker conveyor 40-in. wide and operated at right angles for a total distance of 220 ft. Off the end of the Skipulter, the clinker drops to a Stephens-Adamson pivoted bucket carrier. This endless carrier, its buckets always upright whether going filled or returning empty, runs horizontally below ground, rises about 45 feet vertically, and continues on again horizontally, finally dumping the clinker into the new clinker storage enclosure.

Clinker storage capacity is about 300,000 bbl. and distribution is effected by a P&H electric-powered overhead bridge crane handling a 4-cu. yd. clamshell bucket. Clinker and gypsum bins serving the finish-grinding department are kept filled by the crane.

Waytrol feeders at the bins feed clinker and gypsum into the two ball mills which do the preliminary grinding in the two-stage finish grinding department. One of these is a 10- by 10-ft. Marcy mill with Westinghouse 875-hp. electric-motor drive; the other is a Smidth Tirax 9½- by 18-ft. 8-in. unit of the identical type used on the raw end. The mills, together with the elevators, separators, screw feeders and two Allis-Chalmers 7- by 30-ft. tube mills for final grind were installed when the first improvements were undertaken at Oro Grande in 1944. Two additional tube mills are now being installed, both of the same size, make and character as the two in service. These will be ready to operate late this summer and, along with some miscellaneous changes being effected at the same time in the general mill layout, will complete the finish end improvement program. Allis-Chalmers 600-hp. motors drive the tube mills.

Finished cement is carried to four 15,000-bbl. silos by Fuller-Kinyon system. With present peak demand, these are able to handle the output without difficulty, but additional finish silos are now in the planning stage and will be erected in the months to come to provide the surge storage capacity required to match the stepped-up output of the modernized plant.

The packhouse is equipped with a Modern 4-tube packer to sack that portion of the output not shipped in bulk. Here, too, the company has expansion plans, including the addition of more packing machinery. Filled sacks coming off the packer belt are carried by belt conveyor to either cars or trucks. This conveyor is pivoted and can carry the bags to the cars on the spur track on the lower level, or it can be swung upward to load trucks on the truck-loading platform on the upper level.

A separate building adjoining the finish grinding department houses the new high-and-low pressure air compressors serving the plant. Four Ingersoll-Rand PRE Series compressors and auxiliary equipment have installed to provide both high-pressure air for general service and low-pressure air for blending and conveying the raw mix. Two 2-stage high-pressure units, each driven by 400-hp. motors, will supply 1,600 c.f.m. each; two 1-stage low-pressure compressors powered by 350-hp. motors will each supply 3,800 c.f.m.

Power is purchased from a local public utility firm, the California Elecetric Power Co. Transformer and switchgear on the premises were also included in the equipment obtained on high priority when the plant was built. The plant has a total installed horsepower of about 13,000 and by the end of the year this will be upped to more than 16,000, when all the equipment is finally in place and operative.

The improvements were made and

(*Continued on page* 93)

Universal-Atlas' Northampton Plant Installs Individual Dust Precipitators

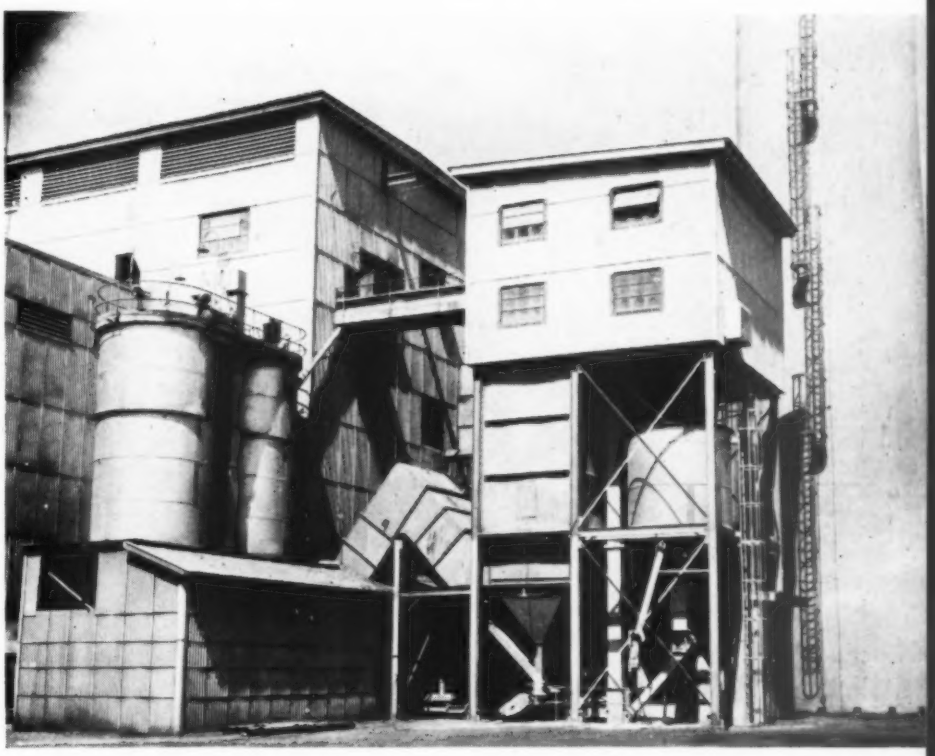
another ON THE SPOT report

WHEN the Universal Atlas Cement Company late in 1943 put in operation its new plant at Northampton, Pa., it was widely acclaimed, and rightly so, as the model plant of the industry. A complete 31½-page description in the November, 1943, issue of PIT AND QUARRY gave all the details about this modern standard and white portland cement plant

By WALTER E. TRAUFFER

which was built around the Breerwood system of flotation and closed-circuit wet raw grinding. All that was needed at that time to make this operation really complete was modernization of the quarry and the installation of electrical precipitators ahead of the kiln stack. Modernizing of the quarry is now under way. The individual precipitators for the gray and white cement departments are now in operation and are described in this article, although final efficiency tests have not yet been completed.

Provisions were made in the original plans for the future installation of a white cement precipitator and for a gray cement precipitator in either of two locations. As a result it was possible to install these units with the minimum of delay in operating the kilns. Only four days were required to connect up the gray unit and less than two weeks for the white unit. Installation was begun early in 1947 and the gray unit was connected up early in November, 1947.



• The white cement dust precipitator with dust tanks and stack at right. Grey dust tanks and fan ducts at left.

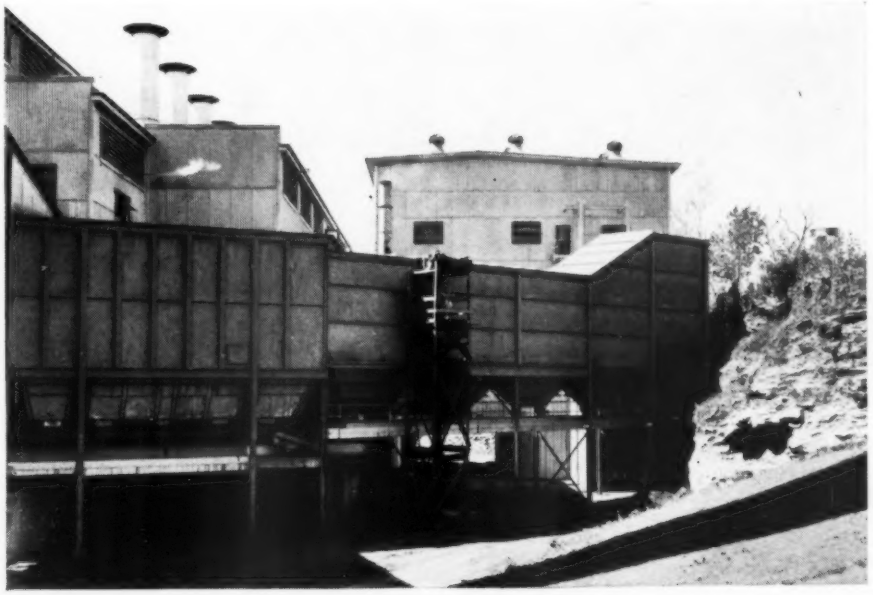
Work Plan In order to hold down the actual kiln shutdown time in the gray department everything possible was done in advance. The precipitators were installed complete with their fans, motor-operated dampers at both ends, dust reclaiming and return conveyors, and flue connections. These connections were welded to the existing flues, so that it was necessary only to cut openings in the flues to put the new circuit in operation.

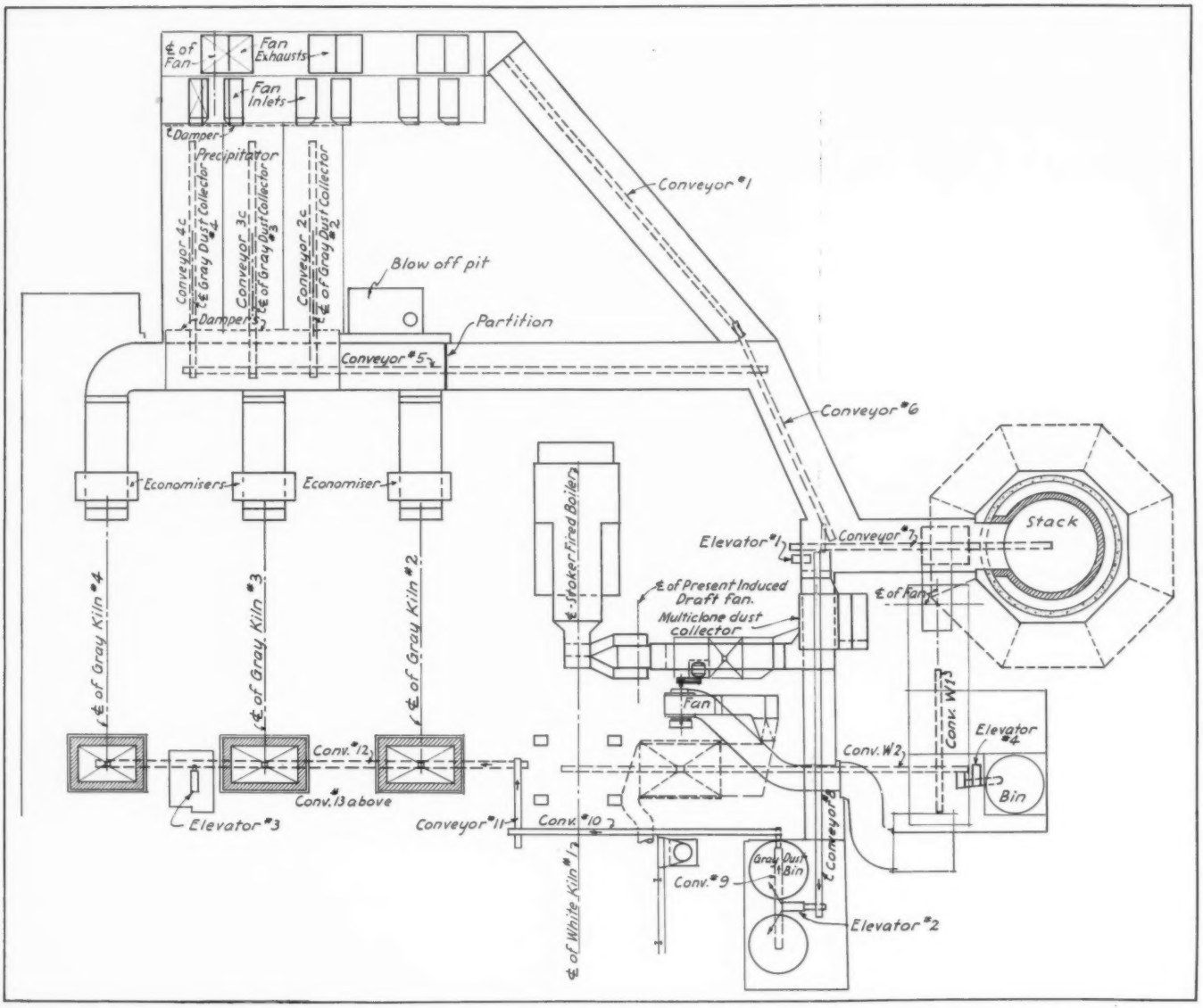
When all was in readiness, the three gray kilns were shut down and the three original fans—with their magnetic drives for individual draft control—were removed and the existing economizers connected direct to the original common flue. This flue was then bulk-headed to cut off the old discharge direct to the stack and openings were cut in it to the already-in-place precipitator connections, etc. The kilns were then started up, one at a time. During the shutdown period the auxiliary boiler was used to keep in operation the thickeners and other equipment which could not be shut down.

These included connections from the three precipitators to the main flue, a new bend from the No. 4 kiln to this flue, and a 72-ft. diagonal section from the precipitators to the main flue at the stack.

The white kiln (No. 1) was cut in by a similar method. A connection

• The grey cement dust precipitator (right) with new duct to stack in foreground. Note scaffold from which efficiency tests are being made.





• General plan drawing showing arrangement of kilns, collectors, ducts, stack, etc.

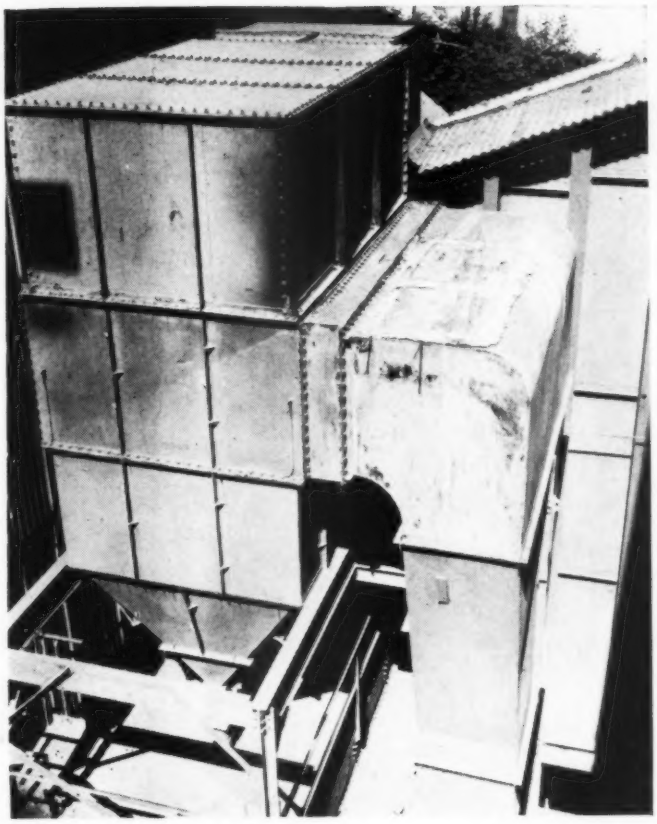
was made from the back housing of this kiln to a new recuperator, from the recuperator to the precipitator, and from the precipitator to the main flue at the stack, opposite the gray circuit connection. When the kiln was shut down only the connections at the kiln and the main flue had to be cut in. Shortly afterward a Multiclone collector was installed after the direct-fired boiler but this was cut in hot and required no further kiln shutdown.

Gray Cement Circuit In the gray cement department the exhaust gases from the three 10½- by 250-ft. rotary kilns pass direct to the three Foster-Wheeler vertical-tube waste-heat boilers. Thence gases go into the 10- by 16- by 35-ft. blocked-off section of the original common main flue and into the three units of the Western Precipitation Corp. Cottrell electrical precipitator. These are standard units similar to those at Universal's Leeds, Ala., plant. In each precipitator unit the first two sections are the standard curtain-rod type and the third is the pocket-electrode type. Rapping of the electrodes is done by air-operated hammers. Individual intake dampers for each precipitator unit make it possible to distribute the load as desired among the three units. By closing both its intake and exhaust dampers any unit can be shut down to be worked on.

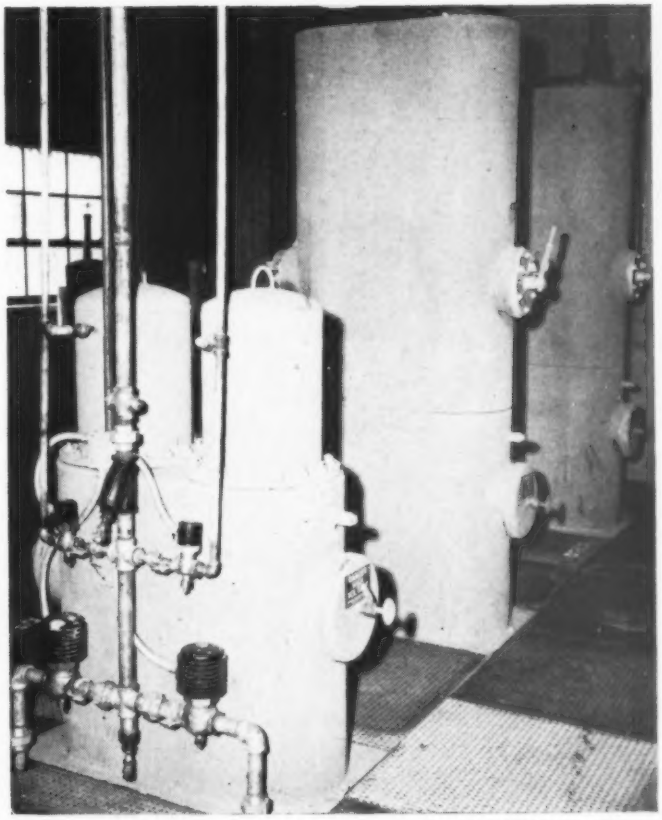
The gases from these collectors discharge into a common flue. Thence through three motor-driven draft fans to the diagonal flue already described which carries the gases to the 18-ft.-interior-diameter by 250-ft.-high kiln stack which serves all four kilns. Variable-speed drum controllers make it possible to balance the load as desired.

White Cement Circuit In the white cement circuit the gases exhausted from the white kiln recuperator pass through a recuperator, a regulating damper and thence into the single-unit white Cottrell precipitator. This is identical with the gray units but has no dampers. Instead, the collector intake has a perforated plate to distribute the gas flow and the flow can be shut off at the recuperator damper if desired. The draft fan for this unit is driven by a 720 r.p.m. variable-speed slip-ring motor and is connected to the main flue at the stack.

Dust Reclamation In the original arrangement the dust from the kilns which did not settle out in the boilers, flues, etc., went up the stack. The collected dust was returned to the feed ends of the three gray kilns, where it was mixed with the slurry cake in pug mills under the filters. The cake was fed into the kilns by belt feeders which replaced the pumps in use when this plant was first described. The same system continues in use now except that the amount of reclaimed dust is much greater. The slurry cake from the filters has an



• The dust collector between the direct-fired boiler and the stack.

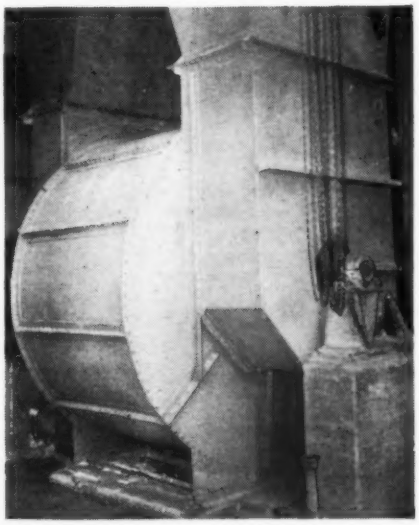


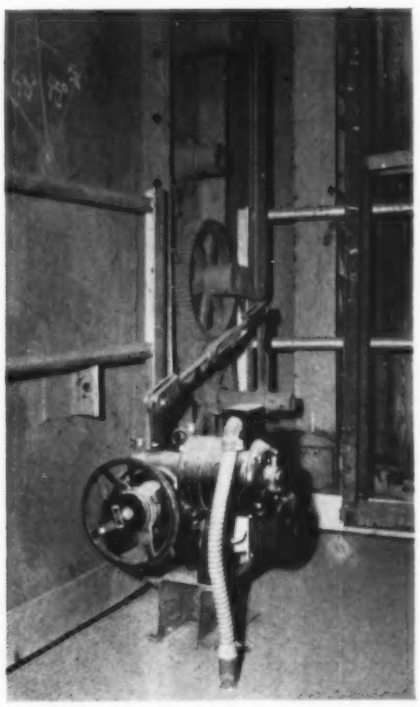
• Some of the rappers in the operating room of grey dust precipitation.

average moisture content of about 21 percent which is reduced considerably by the addition of the dust. The dust from both the grey and the white systems is collected by a series of screw conveyors under each operating unit. In the grey system the dust settling in the three waste-heat boilers, which are lanced regularly, drops into hoppers under which are collecting screws. The three precipitator units have dust hoppers for each section. Each hopper has a tipping valve which stays closed until the accumulation of a certain weight of dust pushes it open. Individual screws under each unit feed from the first two sections of each precipitator unit, to the original gathering screw, which feeds the return system described in the earlier article. Under the new diagonal flue to the stack there is a reclaiming screw to the same system.

In the white system there are dust-reclaiming screw conveyors under the kiln housing and recuperator and the precipitator. These all feed to a bucket elevator from which a long screw feeds to the white kiln dust feeder. Excess dust from the elevator overflows to a surge bin and can be fed back into the elevator. Overflow from the feeder is also recirculated.

• Right: Inlet damper control to one of the grey cement precipitators.
• Bottom: The white cement fan which is connected to the main flue at the stack.



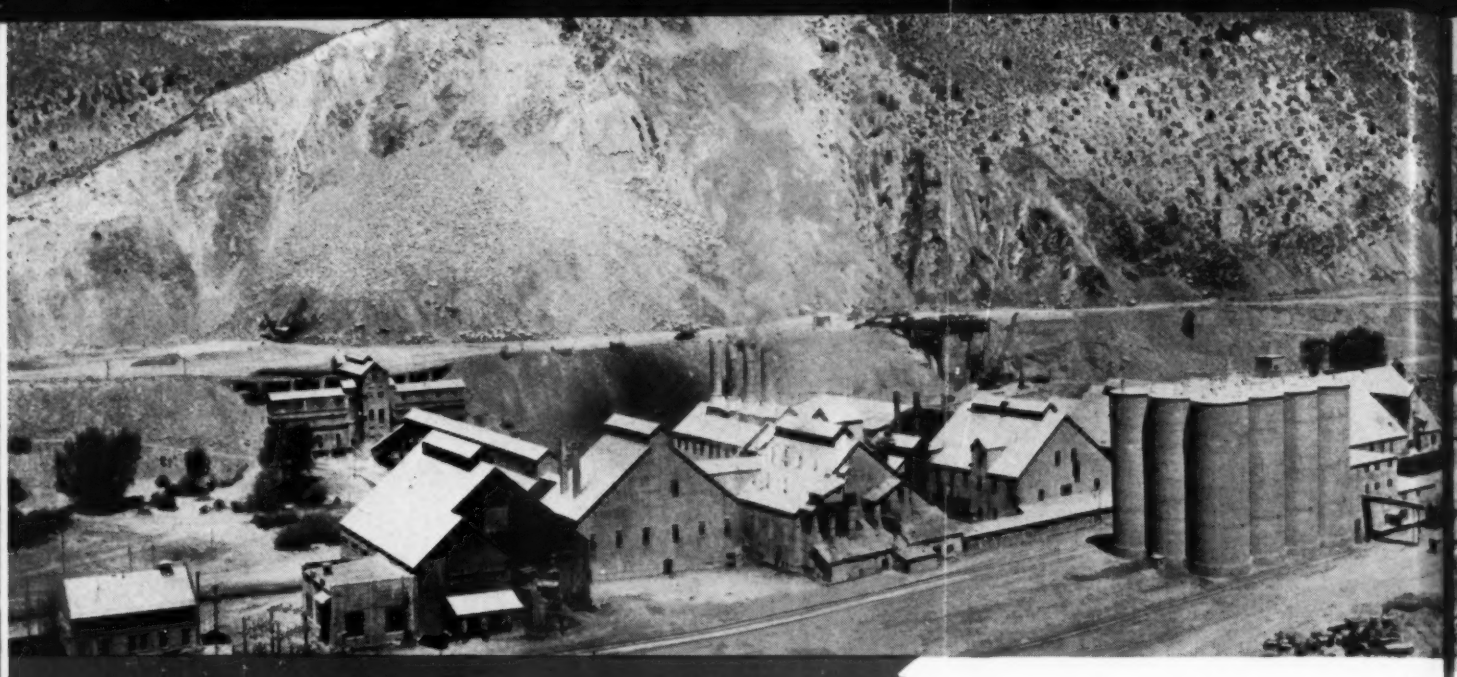


Riverside

(*Continued from page* 90)

cut into production with little interference in production schedules. Output this year is confined to A.S.T.M. Type II and Type II low alkali cements. Other varieties are produced at the company's Crestmore plant. Bulk truck deliveries in Los Angeles County are handled in part by a transfer plant in the mertopolitan area where the cement is received by rail from both Oro Grande and Crestmore.

Safety and cleanliness have been uppermost in the design and rebuilding of the Oro Grande plant. Guards, railings, stairs and walkways have been provided to aid in preventing accidents, and the plant safety committee is an alert organization which strives constantly to keep the workers safety conscious. The success of these measures is reflected in the plant's year-long no-accident record in 1947—a year of peak production and employment.



Huge Expansion Program By Ideal Nears Completion

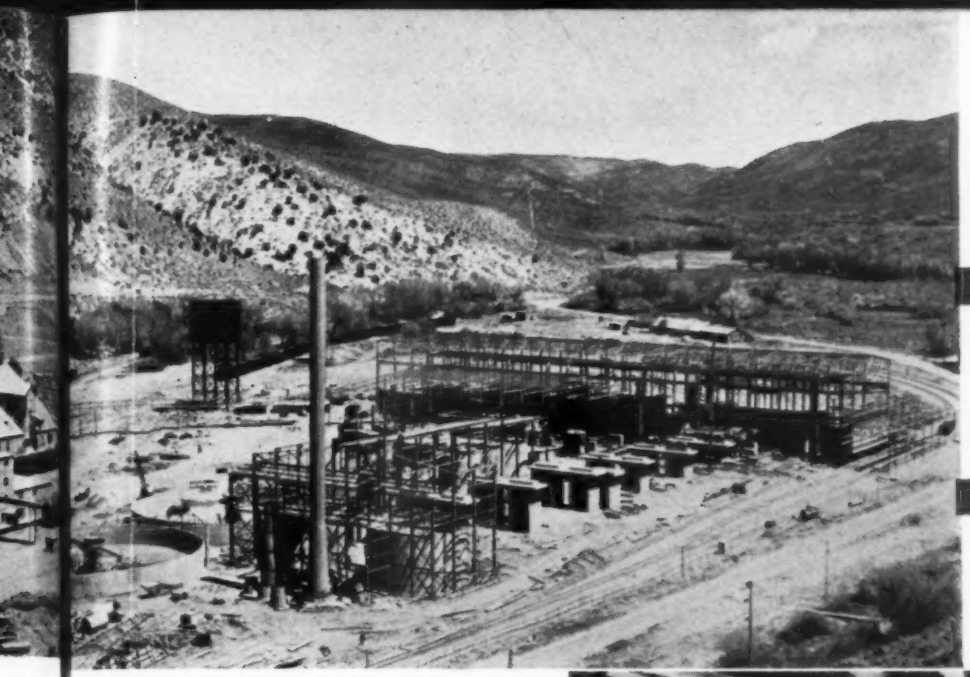
Vast Project Includes Two New Plants

THE general plant improvement and expansion program undertaken by the Ideal Cement Company early in 1947 is rapidly nearing completion, with many of the units in operation and with only the two new plants at Portland, Colo., and Devil's Slide, Utah, remaining on the list for start of production this year.

The construction of a shell washing plant and the conversion of two kilns to lime production at the Mobile plant were completed early in March. This plant is of interest in that oyster shells taken from the Mobile bay are run through a washing and screening process which takes the coarse fraction of the shell and thoroughly scrubs it to reduce the silica to a minimum for the production of chemical lime, all rejects less than ¾ in. in size going to the cement plant. This makes a very happy balance between lime production and cement. The large uniformly-sized pieces of shell, which which make a very desirable lime kiln feed, are separated from the feed to the cement plant, where the smaller sizes are a definite advantage.

The washing plant consists essentially of a Symons rod-deck screen, size 4- by 8-ft., which makes the initial separation at ¾-in. mesh. This is followed by an Allis-Chalmers Low-Head scrubbing screen, size 4 by 14 ft., where the shell is thoroughly scrubbed by high pressure water spray. The coarse fraction from this screen then goes to the lime shell bins and the fines with the wash water are de-watered by the use of two Dorr 4- by 20-ft. rake classifiers. The washed shell and cement plant shell is transported from the washing plant to the cement plant and the lime kilns by means of W-10 Caterpillar wagons of 20-cu.-yd. capacity. The cement plant operations at Mobile have been described in some detail in previous issues of PIT AND

Aerial photograph of Okay, Ark. plant, showing new kiln in operation.



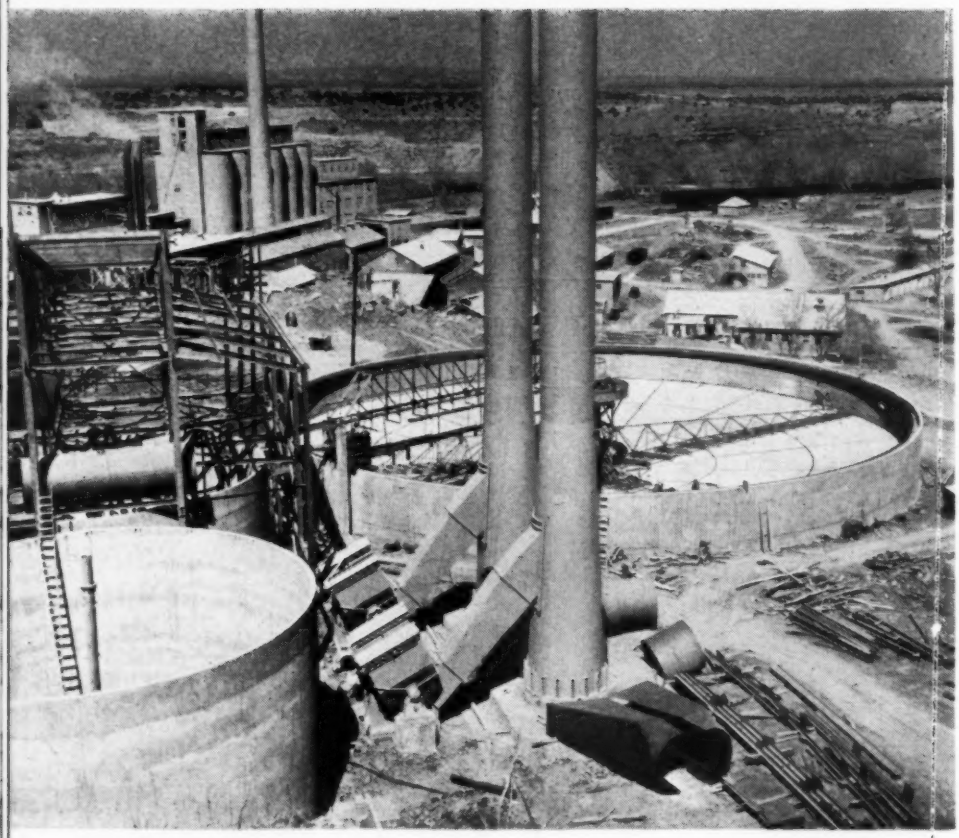
Devil's Slide, Utah plant, showing new plant under construction in foreground. Old plant and quarry are in the background. The unusually high face quarry is notable in this view.

QUARRY. The lime kiln conversion consists essentially of converting one of the wet scrubbers into a shell storage bin and a belt conveyor to the feed end of the kiln. The kiln and cooler were used essentially as originally installed by Aluminum Ore Co. for the Defense Plant Corp.; the only additions were lime conveyors and a lime storage bin with a conveyor and dust collector to the car loading shed.

At the Houston plant Ideal has completed the installation of new raw-material-handling facilities on the water front and a complete new raw grinding unit, which consists of one Traylor 8- by 26-ft. two-compartment shell grinding mill and a Traylor two-compartment 8- by 16-ft. mixing mill.

A complete new installation of slurry tanks has been made consisting of six 2,800-bbl. slurry storage

Above: Aerial photograph of Houston, Texas plant, showing new slurry tanks and new addition to the kiln building.
Below: Aerial view of new Portland, Colo., plant. Old plant is in the background at left.



• Kiln feed tanks and fans, with No. 3 thickener in background, at the Portland plant.

tanks that have been moved from the Mobile property. These tanks, with the necessary pumps, Dorr agitators, transfer lines, etc., make up a complete new slurry handling, storing and mixing arrangement for this plant.

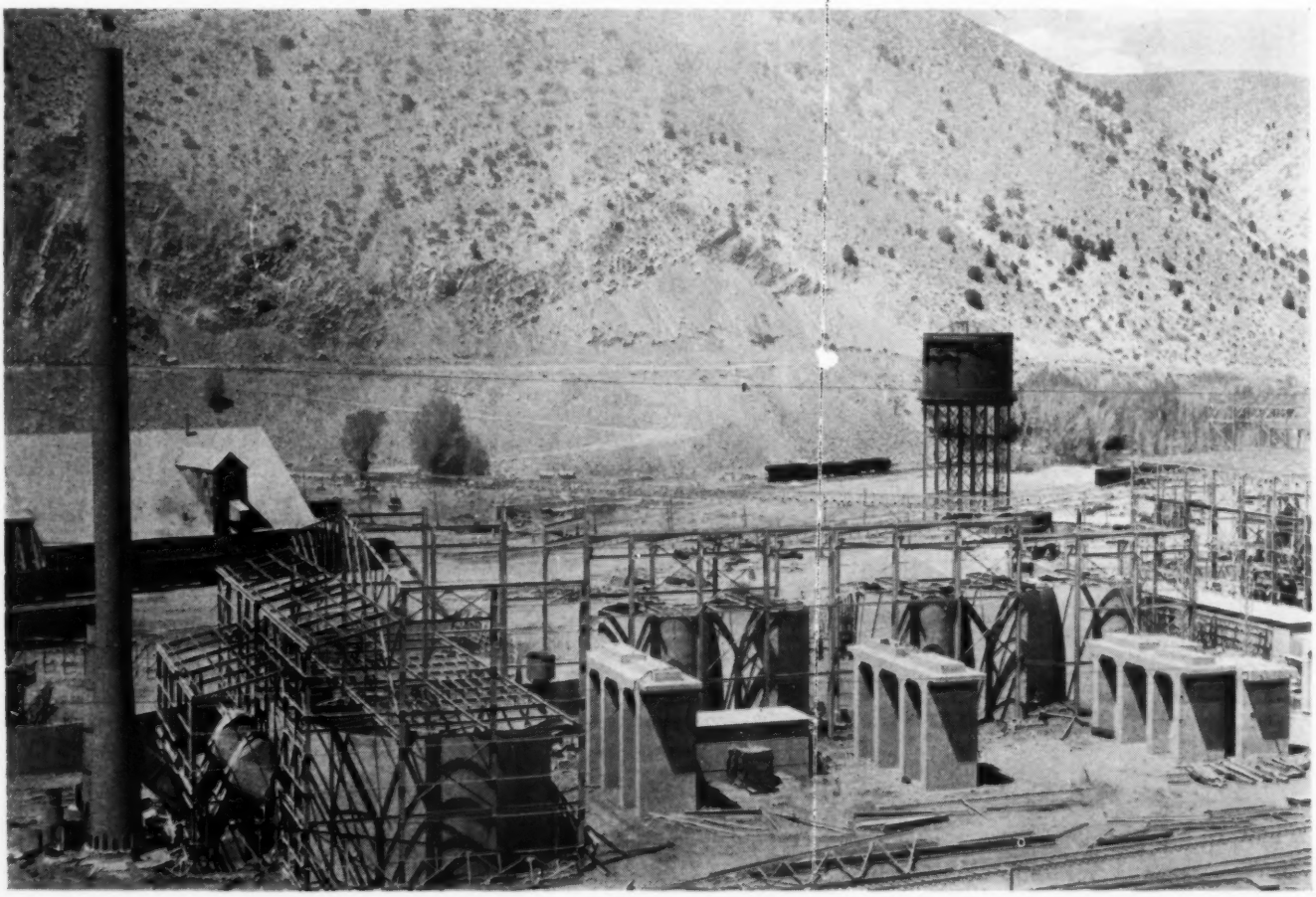
In the kiln department, one 9½- by 250-ft. Traylor kiln was moved from the Mobile property and reinstalled as the No. 3 kiln. This unit is complete with Traylor tubular cooler, ferris wheel feeders, instruments, and miscellaneous controls.

Work remaining to be done at Houston consists of the installation of a new Traylor 8- by 30-ft. three-compartment finish mill with 16-ft. Sturtevant separator. This unit will replace the present two 5- by 22-ft. tube mills. (Installation has been deferred until later in the year.)

The installation of a 9½- by 250-ft. Traylor kiln with tubular cooler was completed at the Okay plant and was placed in operation on October 7, 1947. This installation makes the Okay plant two-kiln operation. The bulk of the equipment installed came from the Mobile sinter plant.

Two 35-E B&W coal mills were moved from the Mobile plant and installed for coal firing of two of the kilns at the Superior, Neb.,

• Devil's Slide plant feed end of kiln area, showing kiln feed tanks, blending tanks, kiln fans and piers.



plant. The installation makes this one of the few plants in the country which is able to burn three fuels (natural gas, oil or coal) at the same time.

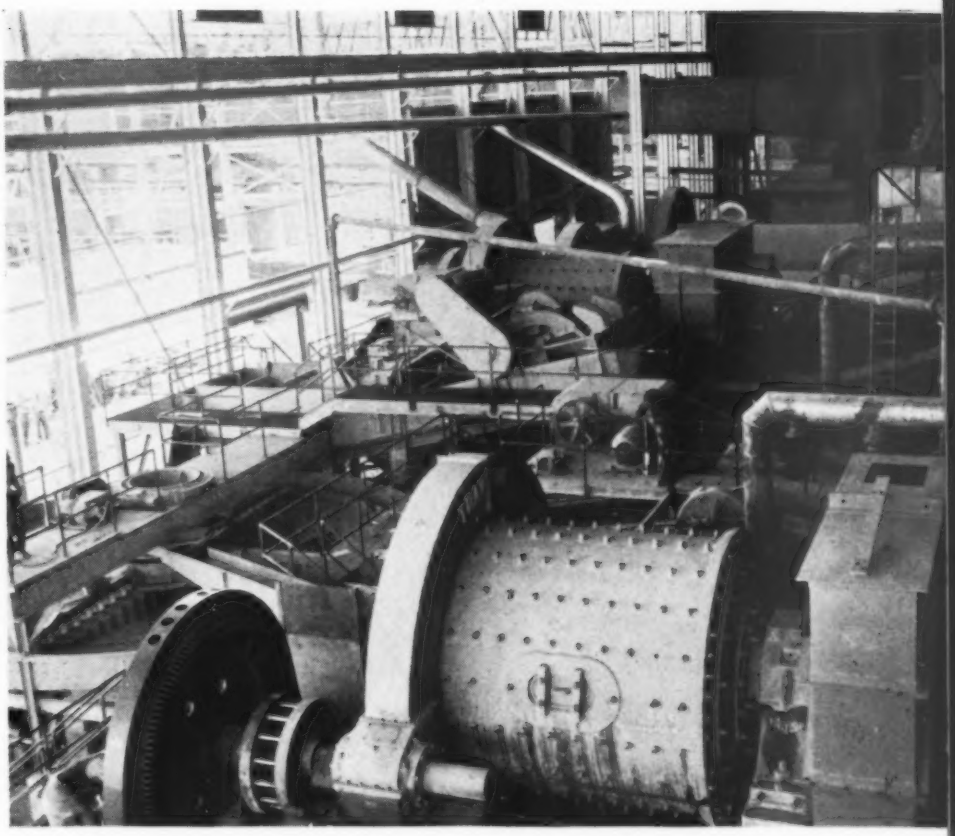
At Portland, Colo., the new crushing plant was put into operation in October, 1947. This plant consists of a 36- by 60-in. Pennsylvania Lehigh roll crusher, followed by a Pennsylvania impactor in closed circuit with a 6- by 12-ft. Allis-Chalmers screen. The plant is located on the north side of the Arkansas River. The finished product, which is a nominal ⅜-in. size, is transported to the old plant and the new one by means of a belt conveyor, one unit of which is 1,530 feet between head and tail pulleys. This conveyor crosses the Arkansas River, the D. & R. G. Railway, the Santa Fe Railway, and the State highway.

The construction work on the new kiln plant is rapidly nearing completion with the two 10- by 400-ft. Traylor kilns nearly completed. The raw-grinding section is practically ready for operation, as well as the finish-mill section.

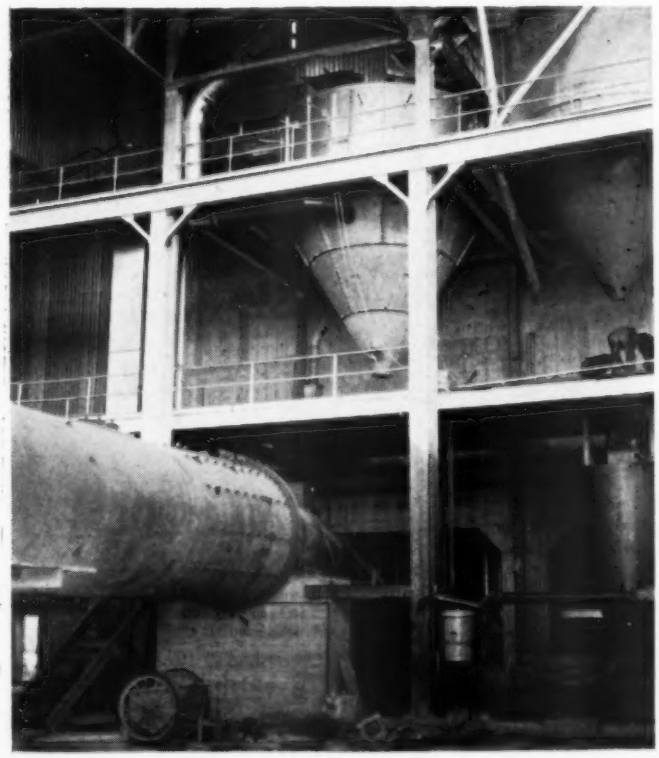
At the Devil's Slide plant Ideal has under construction a new crushing plant and a cement plant which is almost an exact duplicate of the new one at Portland. These units are expected to go into operation some time late this summer.

The new storage silos and packhouse went into operation early in 1947 and were described in detail in the November, 1947, issue of PIT AND QUARRY.

At the Trident plant Ideal has completed installation of a compeb mill, moved from the old Hanover plant, and a new coal mill. These additions enable the Trident plant to operate three kilns 100 percent of the time, giving them a daily capacity in excess of 2,700 bbl. per day. This work has been completed and has been in operation since early 1947. At the present time Ideal has under way the planning and engineering for the addition of a fourth kiln, with the necessary auxiliaries in the grinding, crushing and packing departments. When these improvements are completed, it is expected that plant capacity will be doubled.



• Raw mill section of the Portland plant. Classifiers are seen between the secondary and primary mills. Secondary mill is in the foreground.



• Finish grinding section of the Portland plant, with mill in left foreground. Separator and marginal bin are in the top background, while pumps and compressor are in lower background.

Foreign Aid Supplies Stored In Uncle Sam's Big Cooler

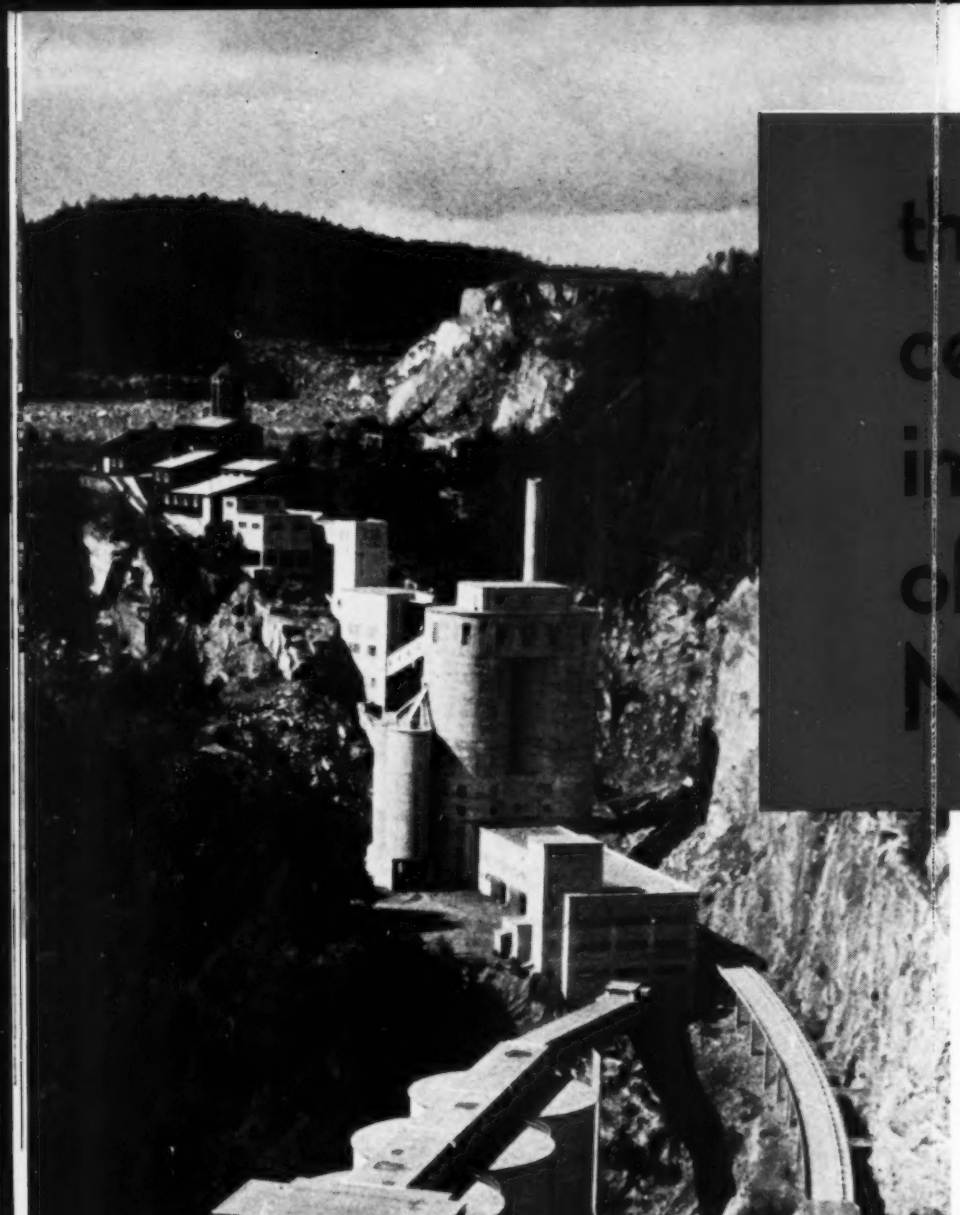
The underground caverns of the George W. Kerford Quarry Company, Atchison, Kan., which was taken over by the United States government some months ago for use as a natural refrigerator, has made the headlines again.

Fifty carloads of canned Mexican beef earmarked for European relief have been stored in the big subterranean cooler. The beef was purchased in Mexico by the U. S. Department of Agriculture in areas free from the hoof-and-mouth disease so prevalent in that country. It will be shipped abroad via New York. Also stored in the old limestone mine are about 400 carloads of fresh potatoes from Minnesota and 250 carloads of powdered eggs. You never can tell what will happen to a hole in the ground.

1948 N. S. G. A. Yearbook Available to All Producers

Continuing the custom established last year, the National Sand and Gravel Assn., 1325 E Street, N.W., Washington, D.C., has issued its 1948 yearbook. A copy has been sent to all member producers, and non-members are invited to write in for their copies.

The book contains a list of association officers and members of the board of directors; a list of officers of the Manufacturers Division; and the names and addresses of active and associate members. The yearbook also gives a brief account of the work of the association since it was organized more than 32 years ago.



the cement industry of NORWAY

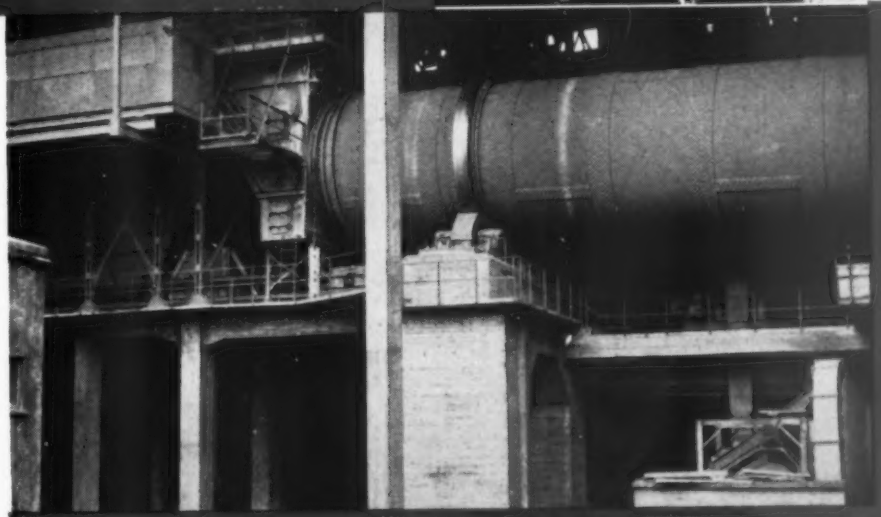
By JOHS. RUTLE

another P and Q exclusive

DURING the last war Norway was occupied by German forces for more than five years. The conditions in the cement plants were extremely difficult during the time of occupation. The Germans had need of cement, especially for fortification of the west coast of Norway, to meet an expected Allied invasion. Norway was considered to be an essential part of the "Festung Europa". The occupant kept armed guards in the cement plants to supervise the operation and as a safeguard against the well organized and very active underground sabotage troups. In spite of this precaution, however, the output was slowed down to a minimum. The occupant was therefore forced to import large quantities of cement from Germany. Fortunately the plants did not suffer any direct war damage through bombing or other warfare. However, at the end of the war the managements of the plants faced a difficult problem, as the machinery was worn down due to shortage of replacement parts during the time of occupation. In addition to this the domestic demand for cement

• General view of quarry and raw department at the Dalen Portland-Cement Company. The raw department lies on a rather steep hill between quarry and kiln department. Silos in the background are for low and high rock. Silos in the foreground are for blending of rock flour.

Wartime and post-war conditions and expansion progress



• Top: View of rock silos at the Dalen Portland-Cement Company with concrete truck ramp at right.

• Right: View of crushing department at the Dalen plant, showing secondary crushing building and inclined conveyor for rock to silos. Note the attractive concrete structures.

• Bottom: View of the Lapol kiln showing the section where the traveling grate unloads the charge into the rotary section.

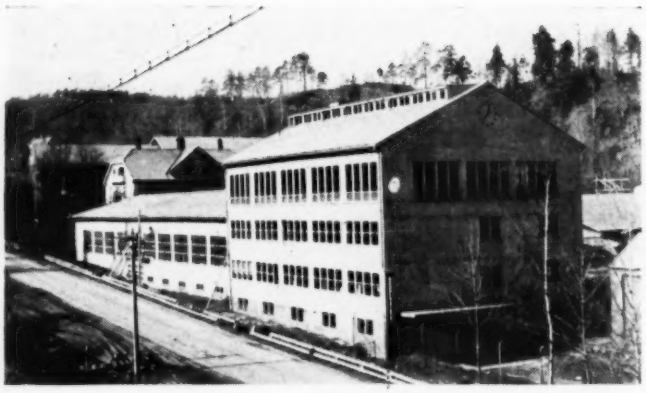
was greater than ever before. However, since then good progress has been made. The production has been increased and is higher today than ever before. This is chiefly due to new installations, which will be mentioned later in this article.

Today the total annual capacity of the cement plants in Norway is about 3,300,000 barrels. As the population of the country is about 3,000,000, the annual production capacity is a little over one barrel of cement per inhabitant.

Before the last war the country had a surplus of cement and exported some, mostly to overseas markets. Today the whole production is reserved for domestic purposes. But in spite of this, the output can hardly catch up with the increasing demand. The main reason for this is the German destruction of the country. Several countries have suffered more war damage than Norway, but still the damage caused by the occupant was very severe. This is the case especially in Finmark—the land of the midnight sun—located in the region far north of the polar circle. This part of the country is rather thinly populated, but covers an area of 24,000 sq. mi. The Finmark area was completely destroyed by German forces. There was absolutely nothing left—not even a single insulator used for telephone poles was intact. The poles were burned and the insulators were crushed or pulverized. For several reasons the rebuilding of this area is a very difficult task, but still good progress has been made during the three years that have elapsed since the war ended.

Today a great deal of the cement is also used for dam construction work for hydroelectric power. Norway has altogether installed 2,600,000 kw. of hydroelectric power. That is, in proportion to the population, more than any other country in the world, next to Canada. Still there are 8,000,000 kw. of waterpower that are not yet utilized, but there are plans for this in the future.

Both gravity and arch dams have been built but today the tendency is



• Attractive service building at the Christiana Portland-Cement Company. On the ground floor is the storage and repair shop.

to build arch dams. Considerable trouble has been experienced in the country with large concrete dams, due to acid mountain water dissolving the lime in the concrete. Many dams have been built with rather lean concrete mixes, which have proved insufficient to resist the action of the impounded waters, having pH values from 5.7 upwards. Several types of cement have been used to reduce the difficulties, but the only safe way seems to be to make use of rich concrete mixes, and a proper composition of the aggregates—that is, a dense homogeneous concrete—through which the water can not percolate. At present several large dams are under construction and new hydroelectric machinery has been installed, which within two years will give another 400,000 kw., chiefly for the industry and for the heating of apartment houses.

Cement is now manufactured in Norway by three independent companies, of which the two largest have a common sales organization; they are also members of the Norwegian Portland Cement Association, which is a national organization to improve and extend the uses of concrete.

Portland cement has been manufactured in Norway since 1892, when the Christiana Portland Cementfabrik started its production. This plant has been operating continuously since that time. It is located alongside the Oslo Fjord, about 20 miles from Oslo. The plant was originally a dry process plant with an annual production of 60,000 bbl. The first kilns employed were bottle or dome kilns. These were later on replaced by shaft kilns, which in turn were replaced by rotary kilns. This is today a wet process plant, with a capacity of 1,500,000 bbl. per year.

The other large cement plant is the Dalen Portland Cementfabrik, located on the southeast coast about 100 miles from Oslo. This plant was built during World War I and was ready to start production when the war was over. This is a dry process plant having a capacity of 1,500,000 bbl. per year.

The third plant is the Nordland Portland Cementfabrik, which started production a few years after World War I. It is a wet process plant with a capacity of 300,000 bbl. per year. The plant is located in the northern part of the country, north of the Arctic Circle.

Norway has abundant amounts of limestone suited for cement manufacture, but most of the deposits are in the northern part of the country where the population is rather small. The two plants in the South are both utilizing a cement rock of Silurian origin. This rock is partly converted into marble and hornfels by volcanic activity. The hornfels is a mineral consisting mostly of calcium silicates and aluminates. It is an extremely hard and abrasive mineral, causing severe wear on the crushing and grinding machinery.

The rock is taken out by air drills, loaded by electric shovels and transported to the primary crusher by locomotives and Euclid heavy-duty trucks. Jaw crushers are used for primary and Symons cone crushers for secondary crushing.

The Dalen Portland Cement company has a very interesting raw department lay-out. The rock is taken out of the hills near the plant. The raw department is located on the rather steep hill between the quarry and the kiln department. The natural slope facilitates the conveying of the raw materials through the crushing and grinding department.

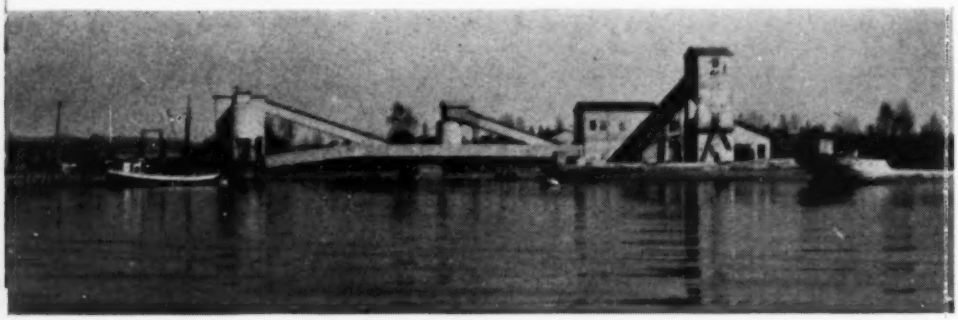
The fuel is a very expensive item in connection with cement production in Norway. At present the cost of coal amounts to $16 per metric ton. Only a small percentage of the coal consumption can be supplied from domestic sources—the coal for cement production is now mostly imported from Poland. Due to the high coal prices, considerable effort has been made to improve fuel economy. In Sweden and Denmark this is done by producing a cement containing 40 to 50 percent fillers. The filler material consists of different types of rock, such as cement rock, quartz, sandstone, sand. The fillers are interground with clinker in the finishing mills. The filler-cement has been extensively used in the Scandinavian area—especially for structures where concrete strength is of secondary importance.

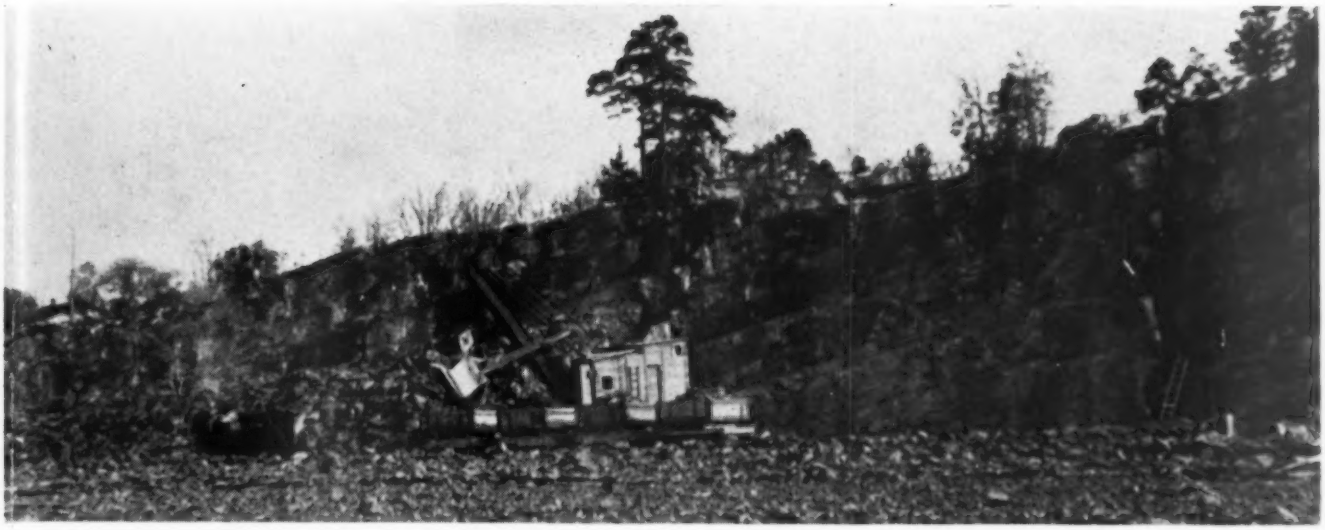
In Norway this type of cement has not been produced commercially, but new kilns with high thermal efficiency have been installed and much has been gained by reducing the water content of the slurry.

Since the end of the last war the Dalen Portland Cementfabrik has been operating a Lepol kiln of the most modern type having an output of 3,000 bbl. per day. The coal consumption is very low and amounts to 650,000 B.t.u.s per bbl. clinker. The kiln consists of four serial units comprising a nodulizer, a traveling grate, a rotary kiln and a cooler.

The Christiania Portland Cement company is operating three Unax kilns of the conventional F. L. Smidth design. The largest one is 11 by 360 ft., with an output of 2,100 bbl. per day. The water content of the slurry, which used to be 32 to 33 percent, is now reduced to 26 percent. This exceptionally low water content is obtained by means of a certain water reducing agent, which is added to the raw materials at the inlet of the raw-mills. The method which was worked out in the plant's own laboratory, has improved the fuel economy of the kiln 10 to 15 percent. The agent also acts as a grinding aid, improving the

• Crushing department and rock silos at the Christiana plant. The quarry is on an island and the rock is transported to the plant by barges.





• View from the quarry at the Christiana plant. The height of the benches is governed by the natural seams and varies from 6 to 15 ft.

grindability of the raw materials.

The Norwegian cement rock has a rather high content of pyrite (FeS_2). In order to get a clinker containing less than 1 percent SO_3, certain measures must be taken. It is established that the sulphates in the clinker are chiefly combined with alkalies. In long rotary-kilns with high fuel economy there is a considerable circulation of sulphuric compounds—as many of these compounds volatilize in the burning zone and condense as alkali sulphates in the cool region of the kiln. The sulphate content of the clinker is found to depend largely on the operating conditions of the kiln. It is not proposed to deal here at great length with all the details which influence the sulphate of the clinker; but some of the means which have proved effective for lowering the total sulphate content of the clinker are as follows:

1. Increasing the output of the kiln
2. Adding chlorides to the slurry, for instance use of seawater for the slurry
3. Decreasing the air in excess of that needed for combustion
4. Regulating the position of the burner pipe by moving its outlet end from its usual position in the center of the kiln slightly in the direction of the charge, so that the charge comes into closer touch with the reduction zone of the flame
5. Discarding the flue dust.

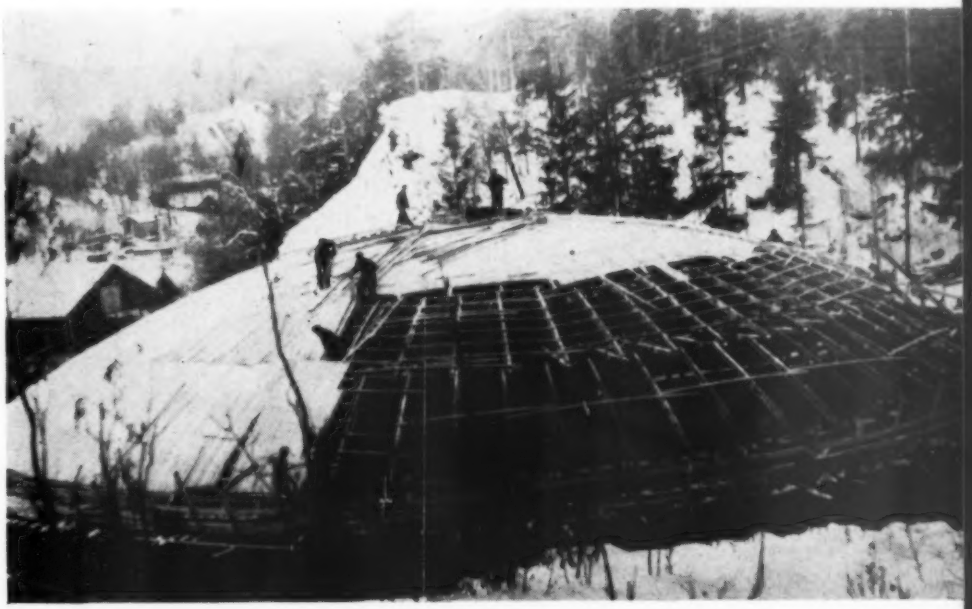
Up to the end of the last war coal had been the only fuel employed for cement manufacture in the Scandinavian countries. But after that time application of oil fuel alone or in conjunction with coal, has been most common. The reason for this was the high cost of the coal in comparison with oil at the time the war ended. In addition, oil was then, unlike coal, available in sufficient quantities. Since then the cost of oil, compared with coal, has become much higher. The tendency today is therefore toward the use of coal fuel.

The raw and finish grinding accomplished in open circuit, chiefly by 3-compartment mills. Closed circuit wet grinding has not been adopted in any of the Scandinavian countries hitherto. As far as Norway is concerned, the main reason for this is the comparatively low cost of electric power, which has been available at the cost of 2 to 3 cents per kw.h.

More than two decades ago barrels were replaced by paper bags as containers for cement. Today paper bags are employed exclusively. Each bag contains 110 pounds (50 kilograms) net; that is, 20 bags to a metric ton. For export to overseas countries 6-ply paper bags have been used. For domestic shipment 5-ply bags had been used previously, but recently 4-ply bags have been adopted for this purpose, with good results. The Christiania Portland Cement company has its own paper bag plant. The bags were previously partly sewed, but are now all pasted.

Norwegian portland cement is known to be of uniform and high quality. This is chiefly due to a well organized control of the operation made by the plant laboratories, which are in all respects up to date and well equipped.

At present standard portland cement is practically the only type being produced, but there is a great demand for special cements too. The production of these will begin as



• Showing kiln feed silo under construction at the Christiana plant. The silo's wall is solid concrete. The globular roof also poured in concrete is less than 3 ins. thick.

soon as the output can cover the increasing demand for cement. Before the last war the following special cements were produced:

1. High-early-strength portland cement.
2. Ferrari-pozzolan cement. The clinker in this cement has a particular chemical composition as it contains no C_3A. The best results were obtained when the amount of Pozzolan added to the clinker was limited to 10 percent.
3. Medusa cement. The cement is produced by adding a certain calcium soap to the clinker.

The engineering departments of the Norwegian cement plants are busier today than ever before. New machinery is being acquired and future plans worked out.

The following is a partial list of the machinery which has been ordered by the Christiania Portland Cement Co., to be installed within the next two years: One crane for unloading of coal, gypsum and rock, which is transported to the plant by sea; one Symons 7-ft. short-head cone crusher, which will be installed to take care of the oversize rock from the secondary crusher; two 3-compartment raw mills 8½- by 36-ft.; three 3-compartment finishing mills 8½ by 36 ft.; one rotary kiln 11 by 360 ft., equipped with air-quenching cooler of a new design.

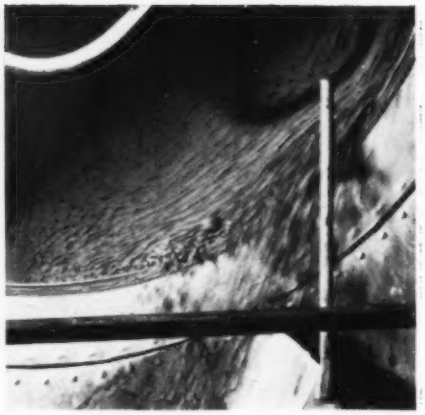
The plant has now under construction a new rock and clinker storage 600 by 100 ft. and a slurry silo for kiln feed 113 ft. in diameter and 20 ft. high. The equipment will chiefly be furnished by F. L. Smidth & Co.

The Dalen portland cement company has under construction or on order the following: a clinker storage 320 by 130 ft., with a capacity of about 60,000 metric tons, furnished with two electric traveling cranes, hoisting capacity 10 metric tons each; a new finish-department with three 3-compartment finishing mills 8½ by 36 ft., with Pendan feeding device and electric dust collectors; one 3-compartment raw mill, 8½ by 36 ft.; two Sturtevant 16-ft. air separators for the raw mills; one Symons 7-ft. short-head cone crusher, which is to be put in service between the secondary crusher and the raw mills.

Plans are being considered for bulk shipment of cement to packing plants. Such plants will eventually be built in the principal cities.

The Norwegian cement plants are great consumers of cement themselves.

Norwegian Siporex Company is a subsidiary of Dalen Portland cement company. Siporex is a precast lightweight concrete product, which has an extensive application in the Scandinavian area. It is produced by mixing portland cement, finely-divided silica sand, a minute amount of aluminum powder and water, moulding the mass and placing it in a high steam-pressure autoclave. The mass is allowed to remain in the autoclave at a temperature of 360 deg. F. for several hours. During this heat treatment chemical interactions between cement and sand are taking place, resulting in the formation of a "glue" quite different from that formed during the hardening of ordinary concrete products. Due to the heat treatment the product is of excellent quality, showing high resistance to alternating freezing and thawing, and extremely low shrinkage. Different types of Siporex are manufactured, varying in weight from 25 to 75 lb. per cubic foot. A partial list of Siporex products includes the following: slabs for insulating houses, refrigerator chambers, etc., masonry bricks for outside and partition walls, reinforced beams, reinforced slabs for roof and floor construction.



• View showing nodulizing in operation of Lepol kiln at the Dalen plant. Water is added through a nozzle until the content is approximately 12 percent.

The Norwegian Asbestos Cement Company is a subsidiary of the Christiana Portland Cement company. This plant is manufacturing the usual asbestos-cement products, such as corrugated roofing sheets and tiles. The annual output is now 9,000,000 sq. ft.; however, this is not sufficient to cover the domestic demand. The plant will now be expanded in an attempt to catch up with the increasing demand.

As previously mentioned, fuel is a chief item for operating costs in the Norwegian cement plants. Another expensive item is labor. In Norway the cost of production is affected by high wages to a greater extent than in most other European countries. The base rate of pay is now approximately 60 cents per hour, based on the current rate of exchange, *viz.*, 5 Norwegian crowns equal to 1 dollar. This does not, however, give a correct impression of the Norwegian wages' rates when compared with American conditions, because of the lower cost of living in Norway. Laborers merely employed on weekdays work 48 hours per week. Those who are also employed on Sunday work 42 hours per week. All the employees are now granted 3 weeks' vacation with full pay.

The plants have well-trained staffs of laborers and officers. Fortunately the production has not been discontinued by strikes for many years. The labor relations must therefore be considered as satisfactory. There are, however, plenty of problems to be solved. At present it is very difficult to remove the bottlenecks of the production. The main reason for this is the shortage of "hard" currency, *viz.*, U. S. dollar and Belgian franc.

Among the leaders in the Norwegian cement industry today are A. Holter, president of the Dalen portland cement company; O. Kielland, president of the Christiania portland cement company; H. Finne, president of the Nordland portland cement company.

Breaking in of Drill Bits Recommended by Mines Bureau

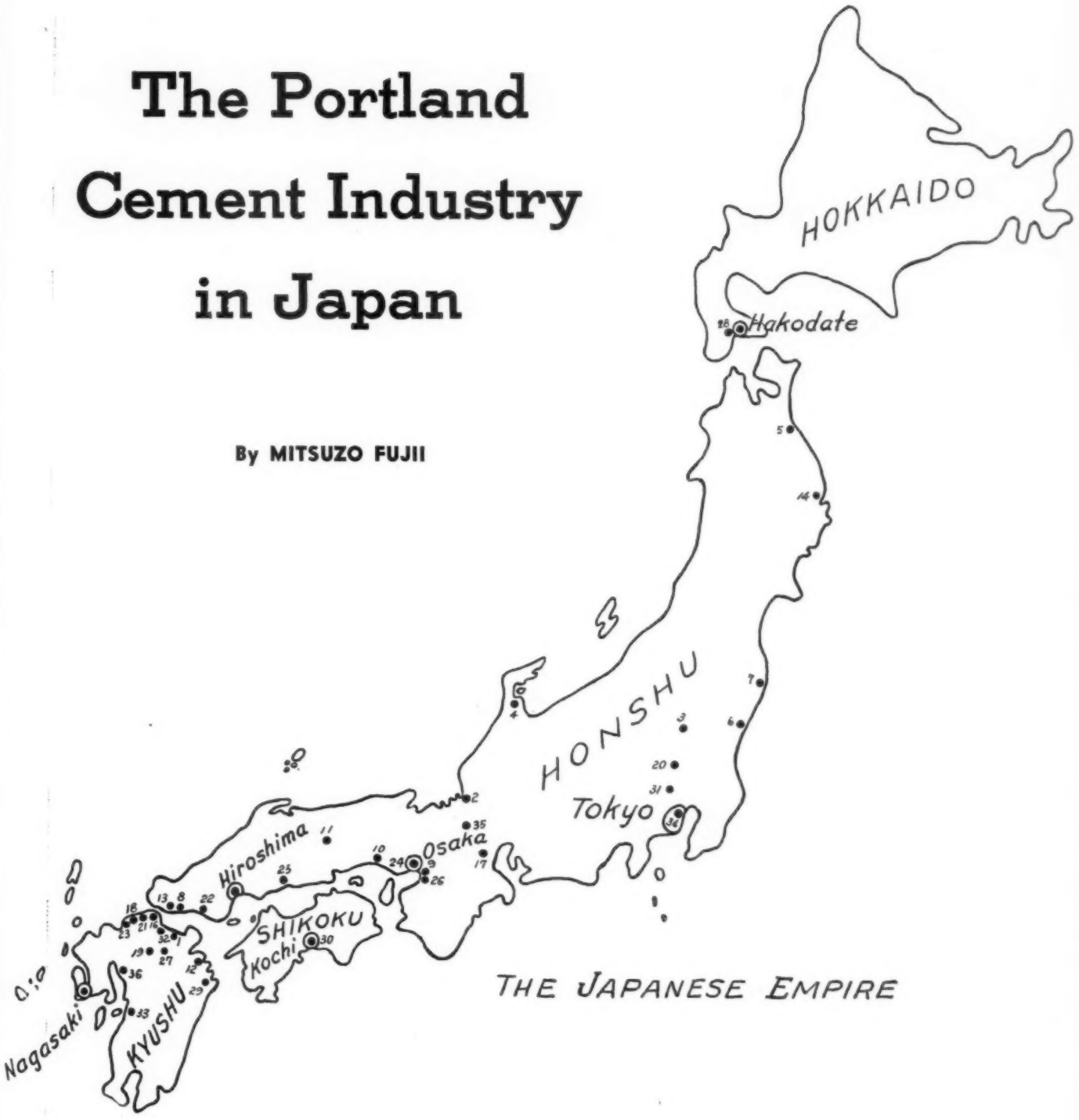
If diamond drill bits used in metal mines and quarries are broken in gradually before being placed in continuous use, drilling costs can be reduced by increasing the footage drilled by each bit and by speeding up the penetration rate with less diamond wear, according to a report of tests on cast-set coring bits issued today by James Boyd, Director of the Bureau of Mines.

Several design factors affecting the performance of cast-set bits were investigated in the tests, including the type, grade, size, weight, and number of diamonds, the distribution of diamonds on the cutting surface and the contour of the surface, projection of stones through the surface, and the number and size of waterways in the bit. In general, the results showed that bits set with the smallest diamonds gave the best average drilling results at the lowest cost per foot.

A free copy of the publication, *Diamond Drilling and Diamond Bit Investigation, Part 2—Tests on Cast-Set Coring Bits,* may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

The Portland Cement Industry in Japan

By MITSUZO FUJII



THERE are two important non-profit cement organizations in Japan: namely, the Japan Cement Association (J.C.A.) and the Japan Cement Engineering Association (J.C.E.A.), both being financed by dues contributed by its member companies in Japan. The J.C.A. was formed in February, 1948, as a successor to the former Japan Cement Industry Association. Its chief functions are the compilation of all statistics on production, demand and use of cement, the rationalization of management and operation, and the investigation of labor problems, as well as the welfare of employees, etc. The J.C.E.A. takes no part, either directly or indirectly, in any commercial operations of cement manufacture. Its activities are designed wholly to promote and improve the uses of cement and concrete, as well as to increase the productive efficiency through technical and scientific research. These two organizations are very closely coordinated, not only on the common problems for the development of the cement industry, but also for the contribution of information beneficial to the users of cement. At the present time the production and distribution of cement for domestic use, as well as the allocation of fuels and supplies for cement production, are controlled by the Ministry of Commerce and Industry. The allocation of cement for the use of the Occupation Forces in Japan and the fuels required are made in accordance with the demands made

Table I—Cement Companies, Plants and Capacities

Company	Plant (Location)	Monthly Capacity (Metric-tons)	Manufacturing Process
Iwaki Cement Co	1. Karita (Fukuoka-Ken)	13,300	Dry
	2. Tsuruga (Kyoto-Fu)	7,000	Dry
	3. Tochigi (Gunma-Ken)	10,800	Dry
	4. Nanao (Ishikawa-Ken)	7,700	Wet
	5. Hachinohe (Aomori-Ken)	13,800	Dry
	6. Hidachi (Ibaragi-Ken)	7,300	Dry
	7. Yotsukura (Miyagi-Ken)	6,100	Dry
Ube Cement Co	8. Ube (Yamaguchi-Ken)	28,500	Wet
Osaka Yogyo Cement Co	9. Osaka (Osaka-Fu)	36,200	Dry
	10. Hirohata (Hiyogo-Ken)	.....	Dry
Onoda Cement Co	11. Atetsu (Okayama-Ken)	7,900	Dry
	12. Oita (Oita-Ken)	26,800	Dry
	13. Onoda (Yamaguchi-Ken)	12,200	Dry
	14. Ofunato (Iwate-Ken)	10,200	Dry
	15. Tawara (Aichi-Ken)	2,500	Dry
	16. Tsunemi (Fukuoka-Ken)	2,600	Dry
	17. Fujiwara (Miye-Ken)	12,800	Wet
	18. Yahata (Fukuoka-Ken)	5,300	Dry
Sangyo Cement Co	19. Gotoji (Fukuoka-Ken)	5,800	Dry
Chichibu Cement Co	20. Chichibu (Saitama-Ken)	25,700	Dry & Wet
Toyo Cement Co	21. Kokura (Fukuoka-Ken)	10,800	Dry
Tokuyama Soda Co	22. Tokuyama (Yamaguchi-Ken)	10,100	Dry
Nihon Seitetsu Co	23. Yahata (Fukuoka-Ken)	2,500	Dry
Japan Cement Co	24. Amagasaki (Hyogo-Ken)	.....	Dry
	25. Itozaki (Hiroshima-Ken)	8,500	Dry
	26. Osaka (Osaka-Fu)	12,600	Wet
	27. Kawara (Fukuoka-Ken)	21,300	Wet
	28. Kamiiso (Hokkaido)	11,400	Dry & Wet
	29. Sayeki (Oita-Ken)	8,500	Dry
	30. Tosa (Kochi-Ken)	9,800	Dry
	31. Nishitama (Tokyo-Fu)	15,000	Wet
	32. Moji (Fukuoka-Ken)	12,300	Dry
	33. Yatsushiro (Kumamoto-Ken)	8,900	Dry
Nihon Koro Cement Co	34. Kawasaki (Kanagawa-Ken)	9,300	Dry
Nozawa Sekimen Co	35. Hikone (Shiga-Ken)	3,700	Dry
Mitsui Kozan Co	36. Omuta (Fukuoka-Ken)	2,100	Dry
Total		388,500	

Table IV—Cement Production

Year	Production (1000 Metric Tons)	Year	Production (1000 Metric Tons)	Year	Production (1000 Metric Tons)
1909	432	1922	1,835	1935	6,118
1910	449	1923	2,213	1936	5,578
1911	542	1924	2,170	1937	5,982
1912	646	1925	2,475	1938	5,446
1913	636	1926	3,163	1939	5,979
1914	616	1927	3,528	1940	5,048
1915	670	1928	3,820	1941	5,836
1916	764	1929	4,274	1942	4,356
1917	935	1930	3,748	1943	3,739
1918	1,129	1931	3,636	1944	2,959
1919	1,095	1932	3,649	1945	1,175
1920	1,341	1933	4,781	1947	927
1921	1,532	1934	5,024	1947	1,232

Table II—Limestone Production and Uses

Year	Production	Domestic Uses (Unit = 1,000 Metric-Ton)					
		Iron and Steel	Cement	Agriculture	Public Works & Buildings	Chemistry	Others
1942	12,654	2,715	4,435	3,186	444	1,069	805
1943	13,860	2,967	4,254	3,881	469	1,303	986
1944	9,373	2,354	3,040	2,063	258	988	670
1945	4,604	925	1,320	1,236	142	520	461
1946	4,612	323	1,514	1,366	560	603	246
1947	4,188	357	1,362	1,337	477	546	109

Table III—Gypsum Production and Uses

Year	Production and Uses		
	For Cement (t)	For Calcined Gypsum (t)	Total (t)
1942	184,927	1,657	186,584
1943	155,251	1,320	156,571
1944	120,130	3,698	123,833
1945	78,707	3,714	83,421
1946	23,840	17,164	41,004
1947	29,490	12,361	41,851

by the Economic Stabilization Board and is periodically revised in accordance with its price policy. The present demand for cement is very large, owing to the vast need for houses, war-damage repairs and a myriad of other uses for the war calamity rehabilitation work. In view of the fact that devastation in Japan during the war was of great magnitude, with 4,000,000 houses destroyed by air-raids, it is felt that even if the cement output could be increased to the highest figure of its capacity, the most urgent and tremendous needs of Japan would still not be satisfied over a period of years, during which the government shall not relinquish the control it has exercised over cement distribution, prices, etc.

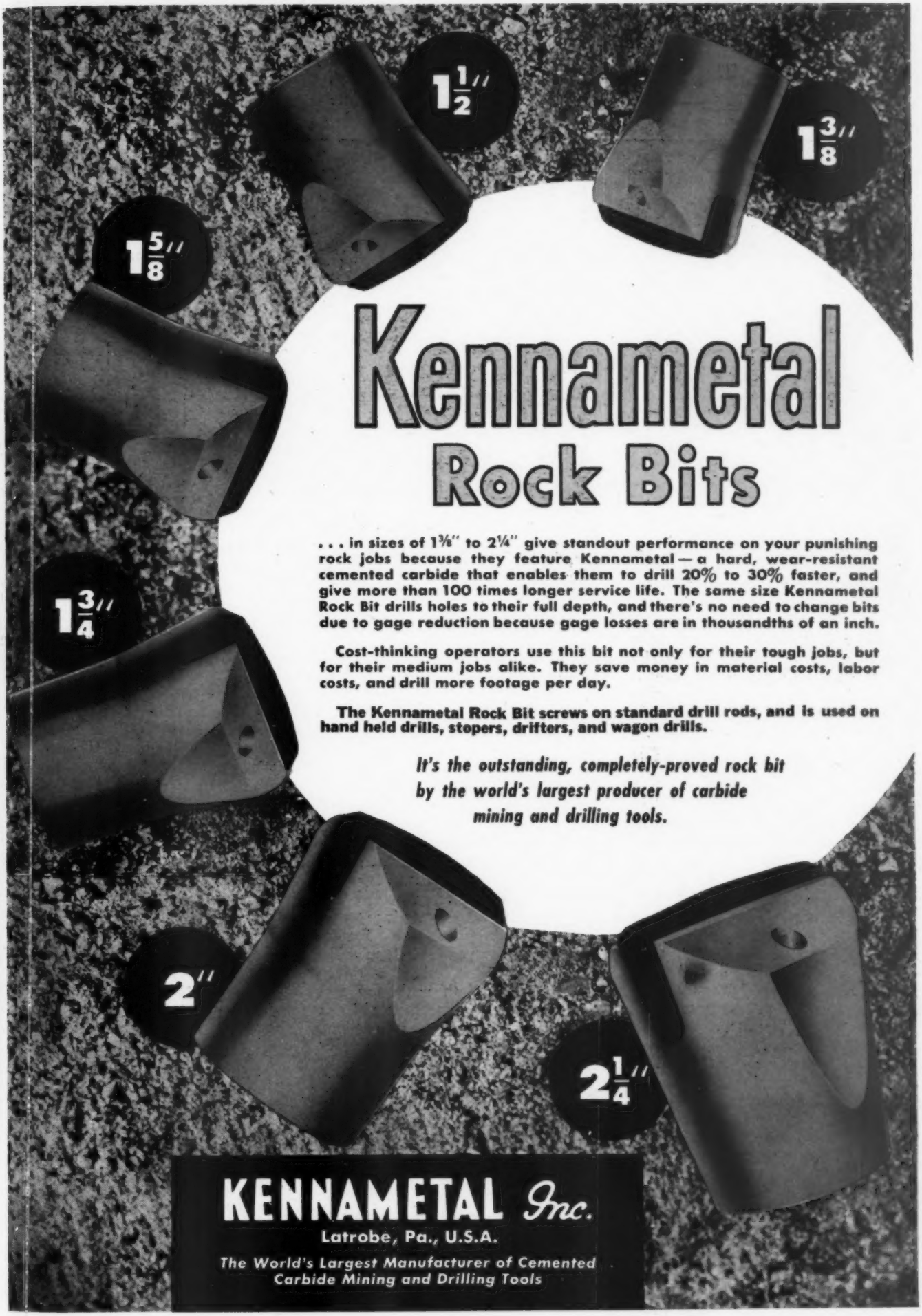
The cement plants in Japan were not greatly damaged by gun-fire and by bombs during the war, and it is estimated that only about 8 percent of the production capacity was affected. Necessary factory repairs have been made without much difficulty and the condition of the plants in general is good at the present. There has been little change or development in production facilities since the war, and no major improvement or modernization program has yet been planned because of the uncontrollable economic instability now spreading over the country; however, it is expected that the program will be intensively carried out and that the output will approach pre-war levels when conditions become more stable.

CEMENT COMPANIES AND PLANTS

In February, 1948, there were 13 cement companies and 36 plants in operation, with an estimated total production capacity of 388,500 metric tons per month, as shown in Table I and the map. One new plant, that of the newly-established Mikawa Cement Co., is expected to go into operation with two Lepol kilns by August of this year, and this will add another 17,000 metric

As is obvious from these figures, the cement industry in Japan has suffered a 60 percent drop in capacity as compared with the peak of 960,000 metric tons in 1939. This reduction in capacity was due to the removal of plants during the war, to the serious shortage of equipment and supplies for repair of machinery in poor condition and operated without the necessary spare parts during the war, and to the shortage of power, transportation and skilled labor.

A unique feature of the large cement plants, including 19 dry-process and 7 wet-process plants, is the installation of waste-heat boilers and turbo-generators, which enable these plants to supply most of their own needs to such extent that the average power generation is about 120-130 kw.-h. per ton of clinker in dry-process and about 110-120 kw.-h. in wet-process plants, thus making it unnecessary for these plants to purchase high-priced electric power in Japan.



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Multiple-Compartment Radial Storage Utilized at Yakima Plant

By HARRY F. UTLEY

• An aerial view of the new aggregates plant of the Yakima Cement Products Company, Yakima, Wash., showing the separating bulkheads over the reclaiming tunnel. At the right are the cableway and the pond.

another ON THE SPOT report

A LEADING manufacturer of concrete products in central Washington, particularly of pipe for irrigation purposes, the Yakima Cement Products Co. is also a producer of sand and gravel at a new plant located north of the city of Yakima. The aggregates plant is replacing an old plant located nearby which the concern took over in the early years of the war to assure an ample supply for its concrete plant in downtown Yakima.

Located on a relatively shallow 160-acre deposit in the Yakima River bottomlands, the new plant is producing at the rate of 100 t.p.h. and, although deficient in fine material in the volume needed at the concrete plant, is yielding a high grade of commercial material. The demand for additional fines is, incidentally, being taken care of to a limited extent by a small sand plant the company recently opened at Grand View, Wash.

At the new aggregates plant a tractor-bulldozer strips the overburden ahead of the excavator, a Sauerman slack-line cableway equipped with a 2-drum hoist to operate the 3-cu.-yd. bucket over the 450-ft. span from pit to plant.

The bucket discharges over a grizzly with bars spaced 4½ in. to a 9-cu.-yd. feed hopper. Boulders rejected at the grizzly are wasted and the daily accumulation of ten yards or so is trucked away. An apron feeder puts the material on the 24-in. by 285-ft. main belt conveyor, which delivers the load to a hopper at a point 65 ft. above ground level at the top of the plant.

The hopper feeds by gravity to three flumes which split the load three ways and, aided by a huge volume (1,800 g.p.m.) of water under pressure, the material is sluiced to three sets of triple-deck gravity screens. Gravel over 1½ in. in size is scalped off and broken by a Traylor TY reduction crusher, the ⅝- to 1½-in. gravel and pea gravel are chuted to finished material bins below, while the bottom-deck troughs, minus ⅝-in. concrete sand, pass to a series of six tipples, or wash boxes, for cleaning and dewatering.

The product of the Traylor crusher is conveyed by belt to a Ty-Rock 4- by 10-ft. vibrating screen carrying ⅝-in. cloth on the top deck and ⅜-in. on the bottom to produce three sizes of crushed material. Screen rejects may, if desired, be broken down to still smaller size by a Symons 2-ft. cone crusher in closed circuit, the product being returned to the 18-in. by 100-ft. belt conveyor which carries the output of the Traylor crusher to the Ty-Rock screen.

The storage bunkers have seven compartments, each of 100-cu.-yd. capacity, to contain the separate gravels, crushed material, and sand. Gates in the bin bottoms feed a 24-in. by 90-ft. horizontal belt conveyor which, in turn, feeds a 24-in. by 125-ft. radial stacker belt. The stacker stores the finished material in piles above a circular timber tunexit openigs for the trucks. Load-The horizontal belt is reversible and at times, is used to feed back excess gravel to the bins back through the system to the crusher. The loading tunnel is 14 ft. high and 12 ft. wide and there are two entrance and two exit openings for the trucks. Loading gates in the roof of the tunnel are manually controlled.

Wash water is supplied at 3,000 g.p.m. by a Peerless pump driven by a 150-hp. U. S. motor.

The bulk of the finished products is trucked directly to the company's concrete plant, some is sold, and some is used in a bituminizing plant operated on the property by the Columbia Asphalt Paving Co.

At the concrete plant in Yakima, where the main office is located, pipe, blocks and ready-mix operations were formerly carried on in the same building. With the expansion of its pipe operations, the company

(*Continued on page* 161)

• On the opposite page, top row, left: Wash water is produced at the rate of 3,000 g.p.m. by a motor-driven pump. Right: A section of the truck-loading tunnel in the foreground between the pile of sand and the separator bulkhead at the left.

• Middle row, left: The stacker belt which piles the finished material above the truck-loading tunnel. Right: The vibrating screen with plus ⅝-in. material coming off the top deck.

• Bottom row, left: The 2-cu.-ft. cone crusher with feed spouts at the left. Right: The new combination concrete-block and ready-mix plant, showing the two bulk cement silos and the conveyor leading up to the aggregate bin.

Caudell and Johnson Firm Ranks Among Top Aggregate Producers

another P and Q exclusive

WITHIN the short space of ten years, the firm of Caudell & Johnson has become one of the leading producers of aggregates in the San Diego area. J. H. Caudell and Arthur S. Johnson were experienced producers, each in his own right but on a small scale, in southern California prior to 1937. In that year, however, they pooled their resources and "know-how," acquired a sizeable deposit in the Mission Valley producing district adjoining San Diego, and built a large-scale commercial sand-and-gravel plant which today has a capacity of 200 tons per hour of washed and graded material.

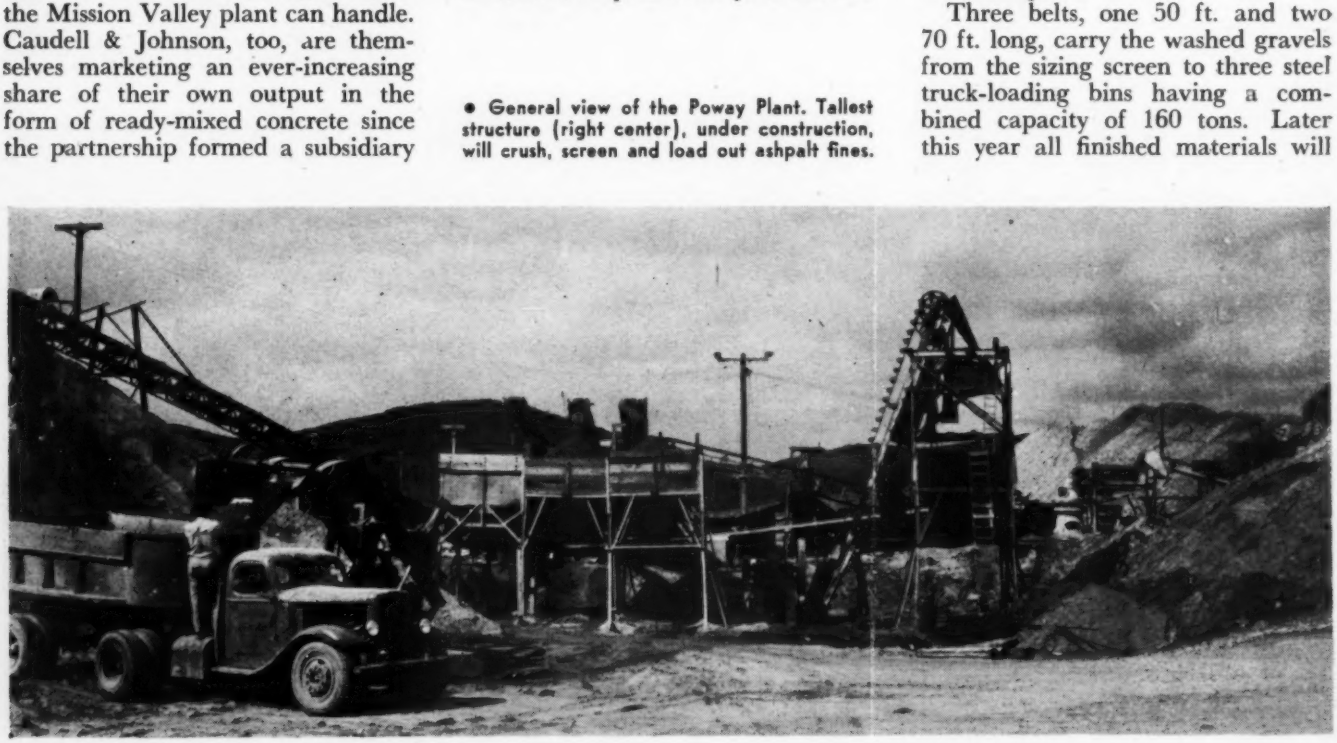
Last year, seeking to broaden their market and at the same time find a clean, well-graded supply, Messrs. Caudell and Johnson leased 300 acres of excellent sand-and-gravel land near Poway, Calif., about 19 miles north of San Diego, where they erected a modern 125-ton-per-hour plant. The deposit, located in a wash in hilly terrain, is easily worked, contains an ample amount of good sand, few boulders, and very little overburden. The small amount of stripping required is done simply by 'dozing. About half the output of the Poway plant is trucked down to San Diego to supply the commercial needs over and above that which the Mission Valley plant can handle. Caudell & Johnson, too, are themselves marketing an ever-increasing share of their own output in the form of ready-mixed concrete since the partnership formed a subsidiary concern, the San Diego Transit Mixed Concrete Co., which today operates three batching plants—one in San Diego, one at Mission Valley, and one in suburban La Mesa. The remainder of the Poway plant's output is sold commercially in some of the smaller communities in the San Diego back-country, principally Escondido.

Although the Poway plant had been in full-scale operation for about a year when visited in February, 1948, a program of improvements was already in progress seeking to step up production, speed truck loading, and widen the range of materials produced.

Excavating is done by a Northwest gasoline-powered dragline equipped with a ⅞-cu. yd. Hendrix perforated bucket. It loads into three International 8-ton dump trucks which deliver to the plant, the present haul being about ¼ mile. The loaded trucks ascend a ramp at the plant and dump into a 16-ton feed hopper whose opening is spanned by a rail grizzly which rejects an occasional boulder over 9-in. in size. A 24- by 40-in. reciprocating feeder, built by the company, puts the pit-run material on a short belt which serves to feed a Symons 42-in. by 6-ft. single-deck scalping screen. This screen bypasses the 1½-in.-minus material and puts the rejects into an Allis-Chalmers No. 5 Gates crusher set to break at 2 in. The combined screen throughs and crusher product are carried up to the top of the plant by the main 30-in. by 80-ft. belt conveyor where all the material is subjected to thorough washing in a Pioneer 11-ft. revolving scrubber equipped with an inner trommel carrying 1½-in. punched plate. The 1½-in. oversize from the scrubber is chuted to a 24-in. Traylor Bulldog gyratory crusher which breaks to 1-in. minus, the product being returned by a 24-in. by 60-ft. belt conveyor to the main belt to close the circuit with the scrubber.

Minus 1½-in. material from the scrubber drops to a Symons 42-in. by 12-ft. 3-deck sizing screen fitted with washing sprays. Screen decks are interchangeable to produce variable material as the demand may require, but normal finished aggregate consists of 1½-in., 1-in., and pea gravel. A No. 4 mesh section on the bottom deck passes the concrete sand, the only size produced at this plant. The sand is cleaned in a 15-ft. drag that originally was a much shorter unit (part of an old Pioneer portable plant) which was lengthened by the company and fitted with a new chain equipped with 4-in. angle-iron lifters. The sand is carried by a 24-in. by 80-ft. stacker belt and stockpiled.

Three belts, one 50 ft. and two 70 ft. long, carry the washed gravels from the sizing screen to three steel truck-loading bins having a combined capacity of 160 tons. Later this year all finished materials will



• General view of the Poway Plant. Tallest structure (right center), under construction, will crush, screen and load out ashpalt fines.

• Belt at left feeds scrubber, while short belt at right feeds pit-run to a scalping screen.

be stockpiled over a tunnel with overhead gates in which the trucks will load. Three International semi-trailers are owned by the company and carry much of the finished material to its destination.

Being located in a semi-arid region, water is at a premium and is carefully reclaimed after use in the plant by two settling ponds. The overflow from the first pond passes to a secondary reservoir, where a Jacuzzi pump supplies about 400 g.p.m. to the plant through a 4-in. discharge line. When the water supply runs low in the summer, it is replenished from a water hole about ¾ mile distant, a 6-in. pipeline having been laid to the plant. A portable pumping unit is used in this service.

Until now, power has been generated at the plant by an Allis-Chalmers 6-cylinder diesel engine. A belt take-off drives the two crushers, while the engine turns a 37½-kw. generator to supply current at 440 v. to the individual motors on the screens and other driven equipment. Public-utility power will be used by the time this article appears, however, a line having been under construction in February of this year. The engine and generator are scheduled to be moved to a 150-t.p.h. temporary plant which Caudell & Johnson will operate this summer to furnish aggregates for the Vale Ranch Dam. The dam, built with private capital, is expected to impound 50,000 acre-feet of water for irrigation purposes.

Under construction at the Poway plant in February, 1948, was a special crushing-and-screening unit which will produce a 100-percent-crushed material in sizes finer than ¾ in. for use in county and state road construction and black-top maintenance. This department will recrush the 1½-in. and larger commercial gravels produced by the main plant, of which there is usually quite an accumulated surplus. A set of Allis-Chalmers 14- by 24-in. double rolls will handle the reduction and will operate in closed circuit with a Cottrell 36-in. by 6-ft. triple-deck vibrating screen. Trucks will load the material from overhead compartment bins.

• Left: Scrubber which sends plus-1½-inch rejects to the gyratory crusher below.
• Right: Three belt conveyors at right angles to main plant deliver three sizes of gravel to respective truck loading bins.

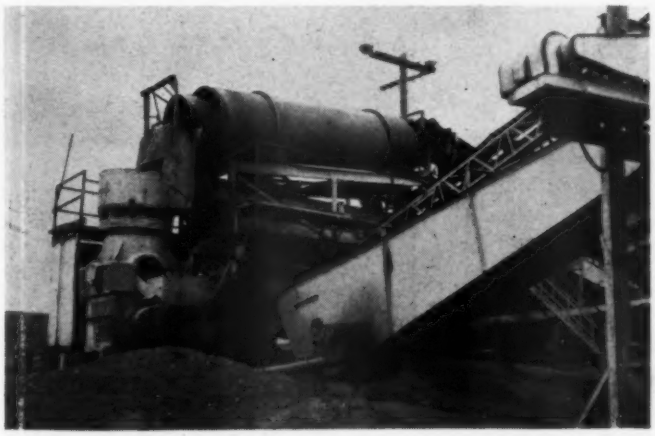
Radial Storage at Yakima

(*Continued from page* 158)

recently moved its block-making and ready-mixed-concrete facilities to a new combination plant a short distance from the pipe plant. The new plant, of steel and concrete construction, uses bulk cement which is stored in two silos. The compartment bin for aggregates is served by an inclined belt conveyor. On the mixing floor, a Besser 40-cu.-ft. batch-type mixer supplies the new Besser Supervibrapac machine while a Rex 2-cu.-yd. drum-type mixer serves the truck mixers. Concrete carried by the company's fleet of eight Jaeger 3-cu.-yd. mixers, is shrink-mixed at the plant, enabling the trucks to carry 4 cubic yards each.

Besides turning out a wide variety of concrete masonry units in both 4-in. and 8-in. heights, the company does a big business in machine-made and poured pipe, both plain and reinforced. Septic tanks, guard rail posts, and a number of other special products are also cast. Lightweight products are now being added, the company having recently acquired a fine deposit of pumice located a few miles from Yakima, where processing facilities were installed last summer.

W. P. Hews is president of the company, R. O. Howard is vice-president, and J. R. Sherman is secretary-treasurer.



Utilizing Diesel—Power Equipment in Underground Mining*

By D. HARRINGTON
Former Chief, Health and Safety Branch, Bureau of Mines, Washington, D. C.
and
J. H. EAST, JR.
Senior Mining Engineer, Bureau of Mines, Washington, D. C.

PART I

DIESEL-POWERED equipment is used to a considerable extent in the underground limestone mines of the Central and Eastern states. Diesel trucks have been in use as haulage units in some of the mines for about 10 years, and more recently other applications of diesel power have been used successfully. Diesel-powered locomotives are used in underground mines in the United States to a far lesser extent; in fact, so far as is known, only four diesel-powered mine locomotives are in use underground in the United States at present; two are in metal mines, one in a limestone mine, and one in a clay mine.

Diesel-powered equipment can be used with safety in underground mining if certain feasible but very important precautions are taken; but any equipment installed underground brings with it hazards that were not present before. This paper intends to point out hazards as well as safety features involved in the use of this type of power equipment underground. There is probably no other type of mining equipment now being introduced into American mines about which less is known and about which there is more misinformation. The foreign technical journals have devoted considerable space to the use of diesel locomotives in European mines, and the matter has been given a limited amount of mention in the technical magazines in the United States. The Bureau of Mines has conducted extensive tests of the gases produced in the exhaust of diesel engines under varying conditions and in differing atmospheres.

Daniel Harrington

Diesel Exhaust Gases

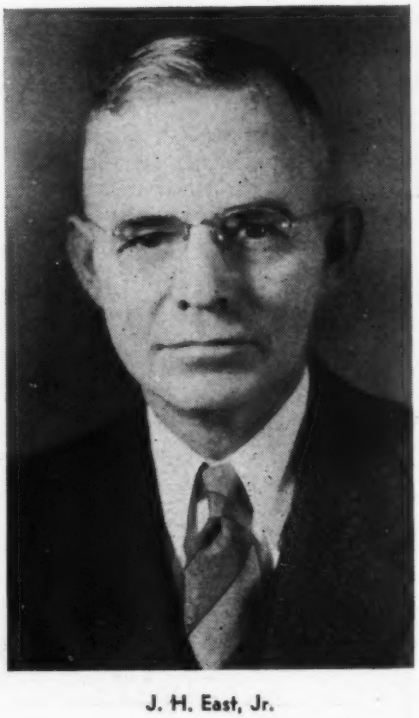
The exhaust of the diesel engine consists of the products of combustion of the fuel oil and the air in which it is burned. The usual fuel oil consists of approximately 85 percent carbon, with the remainder hydrogen and possibly small quantities of sulphur. When the diesel engine is operated within its normal range of power output, practically all carbon in the fuel oil burns to carbon dioxide and the hydrogen to water; if sulphur is present it burns to oxides of sulfur. A small amount of the carbon in the fuel oil does not burn to carbon dioxide, with the result that a relatively small amount of carbon monoxide is always present in the exhaust gases generated by diesel engines.

Aldehydes, which constitute a part of the exhaust, are produced by partial combustion of fuel oil in a diesel-engine cylinder; these largely are responsible for the odor associated with the exhaust.

Oxides of nitrogen also are formed by reaction of the oxygen and the nitrogen of the air inside the cylinder during combustion. The chemical reaction takes place because of the high temperature and pressure in the cylinder during combustion; the fuel oil is not believed to enter into the reaction.

The composition of diesel exhaust gases depends on the air and fuel in the cylinders during combustion, or in other words, the air:fuel ratio. The ratio is expressed in terms of pounds of air per pound of fuel. The maximum ratio is at full speed and load, as when the engine is working at its highest capacity. This is significant, because the weight of the exhaust gases is at a maximum when the engine is working at capacity and requires full throttle or injection of fuel oil.

The air:fuel ratio varies with the elevation above sea level where the unit is operating. A diesel engine adjusted so that it is in perfect working condition at 1,000-ft. altitude and the exhaust gases well within permissible limits will not be adjusted to work at 6,000-ft. altitude, because the air is lighter than at the 1,000-ft. altitude; therefore an adjustment must be made in the amount of fuel injected into the cylinders to restore the air:fuel ratio. The air:fuel ratio of 20 pounds of air per pound of fuel is selected generally as the one most desirable for best operation at full load and full speed when a diesel engine is operating underground, as at this ratio the minimum quantity of toxic gases is produced in the engine exhaust.



J. H. East, Jr.

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Characteristics of Exhaust Gases

Principal gases composing the diesel exhaust are carbon dioxide, carbon monoxide, oxides of nitrogen, aldehydes, oxides of sulphur, oxygen, nitrogen and smoke.

Carbon dioxide is a colorless, odorless gas; it is heavier than air and may accumulate near the floor of a tunnel or mine working that is inadequately ventilated. The maximum carbon dioxide in which a diesel engine can be operated safely is 1 percent, but 0.5 percent is the preferable high limit.

Carbon monoxide is a colorless, odorless gas; it is slightly lighter in weight than air and easily diffuses into the surrounding atmosphere, but it may accumulate in or toward the top of a working place that is not well ventilated. Carbon monoxide in the exhaust gas is formed by the incomplete oxidation of the fuel oil; contrary to the belief of many people, carbon monoxide is always present in the exhaust of a diesel engine. It is extremely hazardous to breathe even in small amounts; a concentration of 0.04 percent in air that is breathed causes headache and discomfort within 2 or 3 hours.

"Oxides of nitrogen" is the term applied to the oxides of nitrogen (NO and NO_2) or mixtures of them. Inhaling these gases causes the formation of nitric and nitrous acids in the respiratory system; the presence of only a small percentage of oxides of nitrogen in the atmosphere may ultimately cause death. The relative toxicity of oxides of nitrogen is shown by comparison with carbon monoxide. An atmosphere containing 0.5 to 1.0 percent of carbon monoxide is likely to be fatal to a human being in less than 30 minutes of exposure, whereas as little as 0.07 percent of oxides of nitrogen may be fatal in the same time. This indicates the danger from exhaust gas that might occur when precautions are not taken while diesel engines are operated in confined places although this hazard can be overcome if suitable available precautions are used.

Chemically an aldehyde is defined as a colorless, mobile, very volatile material obtained from alcohol by moderate oxidation. Aldehydes have a characteristic sharp, suffocating odor and even in exceedingly small quantities irritate the eyes and respiratory passages. Their presence in the exhaust gas is largely responsible for the so-called acrid exhaust from diesel engines; it is likely to be the main odor that can be detected in exhaust gas, because the other gases are odorless, except that slight traces of oxides of sulphur may be present. The odor of aldehydes resembles that of formaldehyde, which is the aldehyde of formic acid.

Maximum Limit of Toxic Gases Permissible

Various private and government groups have determined the maximum limit of certain toxic gases considered permissible in working places. The different groups do not agree in all instances; however, the standards established by all of the groups are feasible to meet insofar as the operation of diesel engines underground is concerned. These limits are shown in Table 1.

Protective Devices

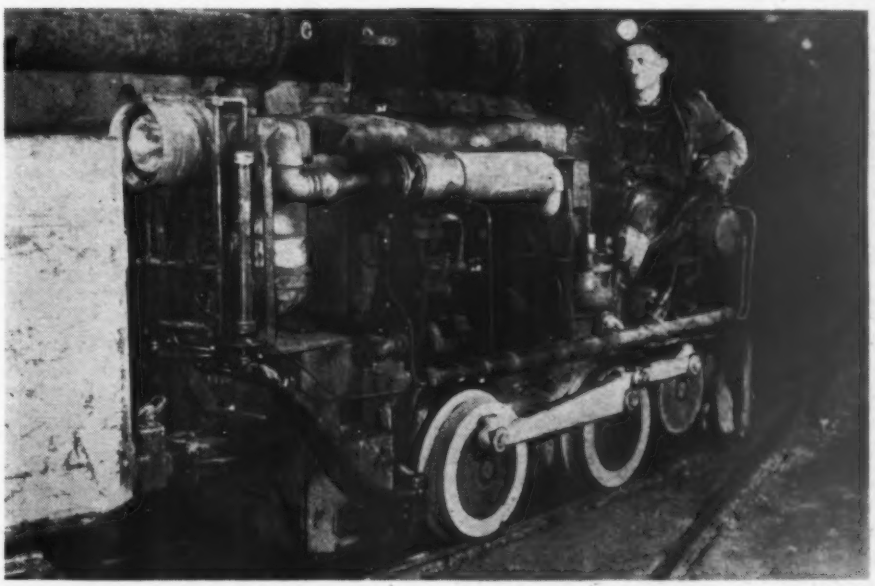
The successful use of a diesel engine underground, or in confined places where men must work, depends largely upon positive and efficient devices that control or remove some of the toxic gases in the exhaust that otherwise would be discharged into the surrounding atmosphere; however, a very important adjunct is the maintenance of an adequate flow of pure air in the vicinity of the engine. If gas or other flammable material is present in the atmosphere, it is imperative that flame arresters be provided on both the intake and exhaust of the engine and that ultra-high temperatures that may ignite accumulations of methane be reduced below the ignition temperature of that gas.

Devices have been perfected that provide protection against some of the hazards of the exhaust gas from a diesel engine and from the possible ignition of methane-air mixtures; these devices have been in use for many years in European countries, and the considerable number of diesel locomotives used underground in these countries in both coal and non-coal mines indicate the effectiveness of the precautionary devices or methods.

Present-day devices for treating the exhaust gas are designed definitely to lower the temperature of the exhaust gas, to absorb some of the toxic gases, to remove in a large part smoke and odorous and irritating constituents, and to dilute the constituents remaining by admixing them with comparatively large quantities of air before the final exhaust is discharged into the atmosphere. The design of some diesel locomotives manufactured in England provides for mixing the exhaust gas of the engine with 30 to 40 times its volume of fresh air before the final exhaust is discharged into

Table 1—Maximum Permissible Limits of Toxic Gases

Group	Carbon Dioxide % of Volume	Carbon Monoxide % of Volume	Oxides of Nitrogen Parts/Million	Aldehydes Parts/Million
Bureau of Mines	1.0	0.01	25	10
U. S. Public Health Service	.5	.01	25	10
American Standards Association	.....	.01	25	10
New York	.5	.01	40	5
Oregon	.5	.01	25	10
Utah	.555	.01	10 to 40	20
Massachusetts	.....	.01	10	10



• A diesel-powered locomotive used for hauling cars in an underground mine.

the atmosphere.

The simplest type of device to treat the exhaust gas consists of a bath of water placed between the engine exhaust ports and the pipe that discharges the exhaust gas into the surrounding atmosphere. Water seems to be the best available absorbent of the toxic and odorous constituents of the exhaust gas. *It is important to remember that carbon monoxide is not absorbed by scrubbers of the above types.* There are many variations in the design of the scrubbers; some of the designs provide for shutting off the fuel supply automatically and applying the brakes if the water supply becomes low, or if the temperature of the exhaust gas exceeds 160 deg. F.

The commonest flame arresters used on the exhaust and air inlet of a diesel engine are of the labyrinth type, which consists essentially of a multiple-metal-plate device that provides narrow passages for the escaping exhaust gas. Other designs have porcelain rings which replace the metal plates, thereby offering less resistance to the exhaust gas. The flame arresters must be kept clean, or must be changed frequently, since they have a tendency to clog with soot and thus build up back pressure.

Operation in Other Than Normal Air

The quality of the air ventilating places where a diesel engine operates is of utmost importance; the atmosphere in underground mines frequently contains higher than normal amounts of carbon dioxide and less than normal amounts of oxygen. Also, it is not unusual in driving tunnels in some rock formations to encounter methane, the gas found in many coal mines; this must be recognized when calculating the ventilating requirements before a diesel engine is placed in service underground.

Whenever a diesel engine operates in an underground atmosphere containing less than 20.93 percent oxygen (normal air), the air:fuel ratio at a given speed and fuel will be greater than that corresponding to operation in normal air.

An atmosphere containing approximately 1 percent of carbon dioxide may not be dangerous under ordinary conditions, but a diesel engine cannot be operated safely when the atmosphere contains more than 1 percent carbon dioxide; in fact diesel engines should be operated in atmospheres that are practically normal air.

Diesel Locomotives in European Mines

Diesel mine locomotives have been used with success in Continental Europe for at least 18 years; most of these are main-line haulage units. Diesel locomotives were first permitted in underground gassy coal mines in Great Britain in 1939, but more than 40 units were in operation in 1946.

Complete statistics are not available for all European countries but in 1939 in Belgium, 62 percent of all mine locomotives were diesel-powered; France used 380 diesel mine locomotives in underground mines in 1937. Late statistics show a total of approximately 1,300 diesel locomotives in use in European mines.

Flameproof mine locomotives manufactured in Great Britain for use in coal mines range in size as follows:

Brake Horsepower	Weight, Tons	Purpose
Less than 20	2.5	Replaces mules
More than 20	4 to 5	Gathering
25	7	Gathering
50	10	Man trips and coal
100	15	Main-line haulage
200	20	Main-line haulage

These locomotives are required to meet certain tests before they can be used underground. Locomotives conforming to the requirements of the Ministry of Fuels are given "Buxton Certificates" which are similar to the permissibility approvals given by the Bureau of Mines.

Exhaust-gas conditioners are required in practically every country in Europe, but the emphasis is placed on excess ventilation of the haulageways.

Typical specifications of the 25; 50- and 100-hp. diesel mine locomotives manufactured in England are shown in Table II.

Desirable Diesel Equipment Features for American Mines

Some desirable features for diesel equipment intended for use in underground metal and nonmetallic mines in the United States are listed below:

(1) Metal and nonmetallic mines usually do not require flameproof diesel mine locomotives, unless there is the possibility of the presence of an explosive gas, as is the case of some Western tunnels and mines. However, flame arresters on the exhaust are desirable in any type of mine, as they minimize a possible fire hazard.

(2) A chemical method of absorbing the aldehydes and oxides of nitrogen in the exhaust gas is desirable, but so far such a method has not been devised. Water absorbs the aldehydes, but the water in the conditioner must be changed frequently enough to prevent it from becoming saturated and thus losing its absorbent qualities.

(3) A chemical method of converting carbon monoxide in the exhaust gas to carbon dioxide, or absorbing the carbon monoxide, is desirable but unfortunately not yet available.

(4) The exhaust-gas conditioner should function efficiently for at least one shift without requiring attention, such as changing the water or adding chemicals.

(5) The exhaust gas, after leaving the conditioner, should be diluted with air before discharging into the atmosphere. This reduces the hazard from toxic gases to persons in the immediate vicinity of the mine locomotive.

(6) Diesel mine locomotives should be equipped with at least two, and possibly three, independently-operated brakes. Air brakes are desirable as well as those that are hand-operated.

(7) The spring suspension of the locomotive should be designed to provide maximum stability on rough, uneven tracks. Many mine tracks are poorly maintained, resulting in low joints and uneven

Table II. Diesel Mine Locomotives Specifications.

	25 Hp.	50 Hp.	100 Hp.
Typical track gage	2 ft. 0 in.	2 ft. 6 in.	2 ft. 6 in.—3 ft. 0 in. 3 ft. 6 in.
Diameter of coupled wheels	1 ft. 8 in.	2 ft. 0 in.	2 ft. 0 in.
Wheel base	3 ft. 0 in.	4 ft. 0 in.	5 ft. 3 in.
Height (over-all)	5 ft. 0 in.	5 ft. 0 in.	5 ft. 6 in.
Width (over-all)	3 ft. 4 in.	3 ft. 11 in.	4 ft. 6 in.—4 ft. 9 in. 5 ft. 3 in.
Length (over-all) (without coupling)	11 ft. 3½ in.	13 ft. 0 in.	14 ft. 0 in.
Maximum power attained at:			
Speed of engine, r.p.m	1300	1300	1700
1st gear, m.p.h	3.25	3.00	4.00
2d gear, m.p.h	5.05	4.66	6.00
3d gear, m.p.h	8.56	7.90	9.25
4th gear, m.p.h	12.46	12.25	14.50
Fuel capacity, gallons	7	13	
Weight	4 tons 11½ cwt.	8 tons 10 cwt.	15 tons
Maximum axle load	2 tons 7 cwt.	4 tons 6 cwt.	5 tons
Tractive effort: 1st gear lb.	2450	5310	8000
2d gear lb.	1580	3420	5200
3d gear lb.	930	2020	3400
4th gear lb.	640	1300	2200
Minimum radius of curve, feet	30	30	80

• Diesel-powered tractor loader used for loading cars in a limestone mine.

portions which may cause derailment.

Use of Diesel Mine Locomotives in the United States

Diesel locomotives are used in the United States to only a very limited extent. In November, 1947, insofar as information was available, only four diesel mine locomotives were operating underground in the United States; two of these were in metal mines, one in an underground limestone mine, and one in a clay mine.

In a Tunnel In 1940, diesel locomotives were used underground during the driving and lining of the Delaware River Aqueduct for New York, and much information was obtained by the Bureau of Mines and the Division of Industrial Hygiene, New York Department of Labor, in connection with this enterprise. This information has been published by the Bureau of Mines and the technical press.*

Five diesel locomotives weighing 14 tons each were used on this project; the engines developed 160 hp. at 1,600 to 1,750 r.p.m. Methane was encountered in some of the tunnels; so the engines were required to be of the flameproof type equipped with labyrinth-type flame arresters on the air inlet and the exhaust. The exhaust-gas conditioners or scrubbers washed and cooled the exhaust gas while passing through a water spray. The exhaust gas was diluted with air from the behind the radiator before it was discharged into the atmosphere. It was found desirable to have 10,000 c.f.m. of air per minute for each diesel locomotive to avoid objectionable gas concentrations in these tunnels.

The maximum haulage distance was 5 miles, with an adverse grade for the cars loaded with concrete. Each train hauled 20 cubic yards of concrete, a total of 40 tons. The total distance covered in one month was 11,017 miles and the cost for the month was $0.0222 per ton-mile, covering all expenses.

In a Lead Mine A diesel locomotive has been in service as a main-line haulage unit at a Western lead-zinc mine for more than one year, and the service is reported to be satisfactory. The elevation of the portal of the tunnel is 10,600 feet above sea level. The locomotive as originally installed weighed 5 tons, but it has since been increased to 6 tons to give the locomotive more traction. The diesel engine develops 65 b.hp. at sea level but, on account of the altitude, develops 55 b.hp. at the elevation of the tunnel portal. Some pertinent data relative to this locomotive are tabulated below:

Height (over-all)	4 ft. 6 in.
Length (over-all)	12 ft.
Width (over-all)	3 ft. 3 in.
Track gage	2 ft.
Brakes	Westinghouse air brakes
Speed	5 speeds in either direction
Fuel consumption, 8 hours	6 gallons

The mine cars are 60-cu. ft. Granby type and have a capacity of 3 tons of ore; the empty car weighs 2 tons. The locomotive normally pushes 15 empty cars into the mine and returns with 15 loaded cars. The locomotive has brought out 120 loaded cars in an 8-hr. shift under actual working conditions. The estimated capacity of the mine locomotive is said to be 500 ton-miles of loaded cars and 200 ton-miles of empty cars, a total of 700 ton-miles in 8 hours. The tunnel grade ranges from 0.50 percent to almost 2.0 percent in favor of the load.

The locomotive is equipped with air brakes and two hand-operated brakes. The air brakes are on the driving discs; one emergency brake is on the four brake shoes that contact each wheel, and the other brake is on the transmission. Due to the heavy loads and steep grades coming out of the tunnel, more than ordinary braking power is desirable; a special brake car, weighing 3 tons, is fitted with air brakes on all four wheels and is coupled to the engine at all times.

The tunnel workings were ventilated by means of a suction fan located at the surface and an 18-in. steel pipe; a booster fan was installed 8,500 feet in from the portal and it was stated that 5,000 cubic feet of air per minute was delivered to the headings. A raise driven to connect with old mine workings above has been completed and the ventilation is improved; the state mining department restricted the use of the diesel mine locomotive to the first 8,500 feet from the portal when the diesel was first installed.

Samples of the general mine air taken at the end of the diesel run, 8,500 feet from the portal of the tunnel, were analyzed as follows:

TABLE III

Sample Number	1	2	3
Oxygen	20.25%	20.12%	19.98 %
Nitrogen	79.34%	79.41%	79.56 %
Carbon dioxide	.41%	.47%	.46 %
Carbon monoxide	.00%	.00%	.005%
Total	100.00%	100.00%	100.00 %
Oxides of nitrogen (parts per million)	17	13	28

The air analyses indicated the need of better ventilation of the tunnel; the quality of air has improved since the raise connection was completed.

In a Limestone Mine A diesel locomotive is used as a haulage unit in an underground limestone mine in one of the western states; this is believed to be the

*Harris, William B.; Greenburg, Leonard, and Werner, Gustav, *Diesel Engines in Tunneling Operations*, Transactions of American Institute of Mining and Metallurgical Engineers, vol. 153, 1943.

Stiefel, Fred W., *Operation of Diesel Locomotives Underground*, Transactions of American Institute of Mining and Metallurgical Engineers, vol. 153, 1943.

Ash, S. H., and Naus, L. L., *Use of Diesel Engines in Tunnels*, Bureau of Mines I. C. 7222, 1942, 26 pp.

Holtz, J. C.; Berger, L. B.; Elliott, M. A.; and Schrenk, H. H., *Diesel Engines Underground I*, Bureau of Mines R. I. 3508, 1940, 48 pp.

first small diesel mine locomotive used underground in the United States. The locomotive has been in constant use for over two years. The altitude at the portal of the tunnel is 6,550 feet above sea level.

Two steeply-dipping limestone beds are opened by a crosscut tunnel 8 feet by 14 feet in cross section; drifts are driven right and left at the intersection of each limestone bed. The farthest bed of limestone is intersected by the crosscut tunnel 3,500 feet from the portal. An average of 6,500 tons of rock a month is hauled from the tunnel.

The diesel locomotive weighs 5 tons; the track gage is 24 inches. The exhaust gas conditioner was disconnected and a slight odor of aldehydes was noticeable.

The present ventilation of the underground workings is obtained by the air circulating through the empty stopes to the surface openings; installation of a new ventilating system is in progress and this is designed to circulate 50,000 c.f.m. of air through the stopes. This system will place the diesel haulage road on intake air.

The highest concentration of carbon monoxide observed on a supersensitive carbon monoxide indicator was 0.0025 percent and the analyses of oxides of nitrogen in the general mine air ranged from 0 to 15 parts per million.

In a Clay Mine An underground clay mine in an Eastern state uses a 10-ton diesel locomotive as a main-line haulage unit, transporting about 135 tons of clay 10,500 feet underground and 2,300 feet on the surface. The locomotive has been in service since October, 1941.

The mine is opened by a drift that serves as a haulageway and by two vertical shafts which are used for ventilation. The clay formation is nearly horizontal, and a 2-entry room-and-pillar method of mining is used. The entries are driven 10 feet wide and 6 feet high. The total length of haul underground is 10,500 feet, of which 8,900 feet is graded in favor of the load and 1,600 feet is an adverse grade; the 2,300-ft.-haul on the surface is an adverse grade. The grades favoring the load average 4.04 percent for a distance of 8,800 feet and the adverse grade averages 1.85 percent.

Air circulation in the mine is induced by 4-ft. 10-blade disc fan operating exhausting; the water-gauge pressure is 0.60 inch; and about 12,000 cubic feet of air per minute is circulated through the mine. The main haulageway is ventilated by return air, hence the air containing the exhaust gases from the diesel locomotive does not pass through the working places.

The locomotive requires an average of 22½ minutes to haul a trip of loaded cars from the underground switch yard to the mine scales, and 23½ minutes to return with empty cars. A trip is composed of 21 cars which have a total weight of 13 tons when empty. The normal weight of clay handled per trip is 45 tons. The diesel locomotive is not permitted to idle while underground. Some of the general specifications of this diesel mine locomotive follow:

Weight of locomotive	10 tons
Height (overall)	4 ft. 8 in.
Length (overall)	13 ft. 4 in.
Width (overall)	5 ft.
Track gage	3 ft.
Diesel engine	
Cycles	4
Cylinders, number	6
Bore of cylinder	4¼ in.
Piston stroke	5 in.
Piston displacement	425.31 cu. in.
Horsepower (maximum)	
at 2,000 r.p.m.	165
at 1,200 r.p.m.	125
Compression ratio	16:1
Transmission	4 speeds, separate reverse gear
Chain drive from rear axle to front wheels	
Brakes	Vacuum and hand-operated
Fuel tank capacity	14 gallons

Typical analyses of the exhaust from the diesel engine taken at different times and under varying conditions are shown in Table IV.

The diesel engine is not equipped with an exhaust-gas conditioner but has a blower, which according to the manufacturer has about 1.4 times the piston displacement of the engine. The exhaust gases are diluted to the extent that the blower delivery exceeds the piston displacement.

The production of smoke, irritating and odorous materials by the diesel engine is not considered objectionable under intermediate or heavy loads, but under light loads, particularly on a down-grade haul, considerable smoke, odor and irritation are evident to the rider on the rear end of the trip. This condition does not exist at the locomotive on either up-grade or down-grade haulage underground, probably because the speed of the engine is faster than the movement of the ventilating air current.

The haulageway at this mine is on return air, hence any odors, smoke or irritants produced by the engine exhaust do not go into the working places. This illustrates the advantage of having haulageways where diesel locomotives are working placed on return air, as at this mine, or preferably on a separate split of air so that odors will not go into the working places.

Table IV. Diesel Engine Exhaust Analysis

	Engine Idling	Locomotive Hauling Loaded Trip Upgrade	Locomotive Hauling 21 Cars	
			Empty	Loaded
Oxygen	20.04	15.48	13.69	13.04
Nitrogen	79.27	80.52	81.03	80.96
Carbon dioxide	.64	3.87	5.24	5.88
Carbon monoxide	.05	.11	.04	.09
Methane	.00	.02	.00	.03
Total	100.00	100.00	100.00	100.00
Oxides of nitrogen, parts per million	21	173	207	295

Investments for Economy

Here is a typical modern statement commonly heard in the cement plant. It is copied verbatim: "However, most of the officials who have made the change have discovered that the money paid for motors and wire connections has been a good investment."

On the other hand, calling attention to the "other fellow's side" of the situation. It must be remembered that in these days almost any change, whether mechanical or electrical, is a "good" investment. That is, any change for the better usually pays.

It is not uncommon for officials in a cement plant to believe that power transmission through belting, shafting and pulleys is out of date. They find that when they scrap old shafting, pulleys, belts and hangers, and install individual electric drive they are saving money.

True. But very often they would save *more* money if they would put in modern belts, pulleys, bearings, and lubricating systems. The mechanical end of power transmission has not been at a standstill. Far from it. In fact, it has progressed more rapidly than has electrical transmission, so that now with purely mechanical transmission it is not at all uncommon to obtain a higher overall efficiency than with the very best electrical equipment obtainable. There is nothing unmodern at all about transmission of power through belts, pulleys, shafting and hangers.

But please do not infer from this that this article "knocking" electrical motors. Far from it. Electric motors are advocated, but *not* where belt drive is more economical. Where motors are more economical *always* use them. The trouble is, some enthusiasts are going too far, that's all.

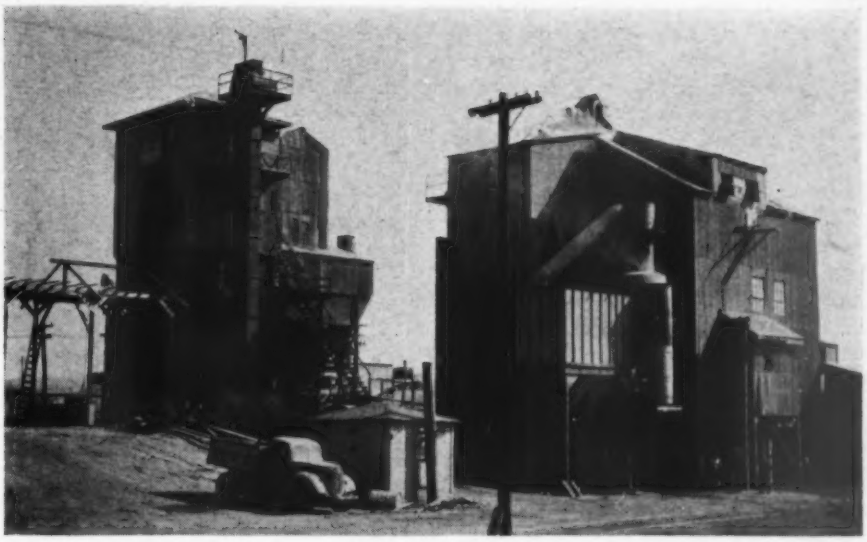
Old Colony Expands Asphalt Plant

another ON THE SPOT report

CONTINUING the expansion of a plant that has been in operation for a number of years, the Old Colony Crushed Stone Co., located at Quincy, Mass., is again adding to the equipment at work in their asphalt plant.

This asphalt, or aggregate-bituminizing plant is located on the property of the crushed stone company, and uses only aggregates produced in the adjacent quarry of the parent company. These aggregates are sized in the new screening and crushing plant built during the war to replace the older installation which was completely destroyed by fire. (See PIT AND QUARRY, December, 1944, pp. 66-68.)

Interplant haulage is done by 10-ton dump trucks, with sand being hauled by a Mack, and the coarse aggregate by a Sterling truck. These trucks dump directly into bins, which are made accessible by an earth and crushed stone ramp. Each bin is 16 ft. long, 16 ft. wide, and 12 ft. deep. A simple bar grizzly at the top of each individual bin keeps any large tramp material from entering the processing system of the asphalt plant. After discharging their loads, trucks pull straight ahead down a similar ramp on the other side of the bins. This eliminates any necessity for time-consuming backing and turning to position the truck over the bin for dumping.



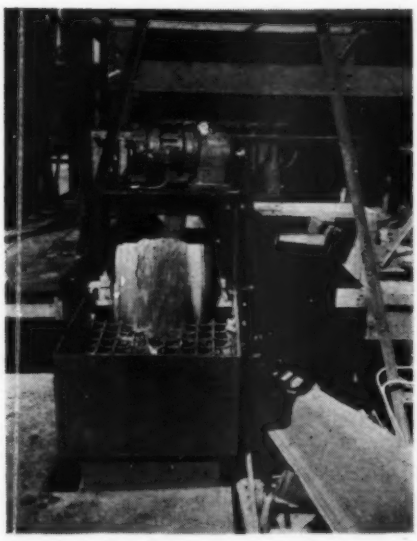
• Plant of the Old Colony Crushed Stone Company at Quincy, Mass., showing the bins (left) and sand hopper and asphalt plant (right).

The bins are tapped at their bottoms, through the use of a series of clam-shell gates made by the Anderson Engineering Co. There are three of these gates to each bin, so arranged as to accommodate the three parallel belt conveyors running in the materials tunnel below the bins. Aggregates in the bins, incidentally, are protected from the weather by a recently-constructed overhead shelter, shown in the accompanying photographs during its erection. There are five bins under this structure, all of 120-ton capacity. From left to right, they are utilized as follows: first bin, spare; second, ¼-in. material; third, ½-in. material; fourth, ¾-in. material; and fifth, dust.

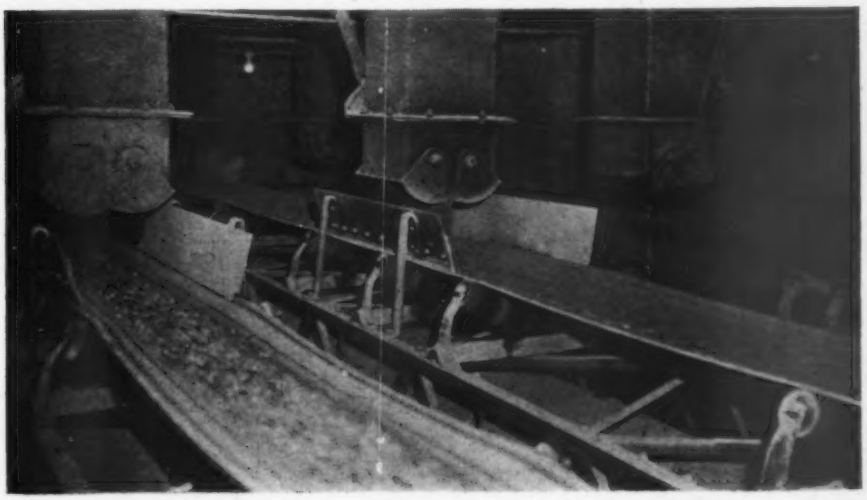
Material from the clamshell gates falls, in order, upon both Boston and Goodyear belting running on Barber-Greene troughing idlers, and is carried out of the tunnel and up to the batching plant itself. The tunnel is 60 ft. long, 16 ft. wide, and 7 ft. high.

Sand is dumped into a separate hopper, equipped with three Syntron electric vibrators to prevent packing and bridging, and is then removed from the bottom of this relatively small surge bin by a Jeffrey vibrating feeder. This feeder delivers the material into the boot of a Link-Belt bucket elevator which, in turn, discharges the sand into an enclosed 450-ton storage bin. From this bin, also equipped with Syntron vibrators, the sand is chuted onto the same belts carrying the other aggregates, and enters the plant proper.

The belt conveyors are driven by a Link-Belt motor reducer through a chain drive. Material coming over



• Above: All ingredients for an asphalt batch, less the actual asphalt, come over the head pulley on the 18-in. conveyor and drop into the dryer.



• Right: Clamshell gates on the bins discharge the stone onto the 18-in. belts, riging on troughing conveyors.

the head pulleys falls onto a 2-in. steel rod grizzly, which removes any objectionable material that has entered the flow. Aggregate is then chuted directly into one of the three driers serving the plant—one drier for each batcher. The two older driers are made by Warren Bros., the other, and the newest, is a product of the McCarter Iron Works. All driers are of the rotary type and are oil fired. Aggregate leaving these machines is, for all practical purposes, dry, and drops into a short chute leading to the boot of a completely-enclosed Link-Belt bucket elevator. Most of the electric motors on these machines are products of either the Link-Belt Co., or the Allis-Chalmers Mfg. Co.

The bucket elevators, in each case, carry the dry heated aggregates to surge hoppers located over the weighing batchers. Two of these batchers are part of the older plant, and have capacities of 1 ton and 2 tons, respectively. The third batcher will also be a 2-ton model, and is even now being installed. All of the batchers are Howe made, and are manually operated.

The mixers serving the weighing batchers are of appropriate capacities, the two older mixers being Warren Bros., the third, as yet uninstalled, will be either a Warren Bros. or a McCarter Iron Works mixer.

The relatively-large storage space devoted to liquid asphalt deserves mention — 78,700 gallons of tank space being devoted to the storage of penetration asphalt; 16,000 gallons to the storage of fuel oil; and 15,000 gallons allowed for the storage of Col-Provia flux. The tanks themselves were made by Warren Bros., and Erie Iron Works.

• Operator at the controls of the one-ton weigh batcher. Dial of scale at left.

As the tanks are installed in the open, some provision had to be made for heating them in winter. A 100-hp. boiler is installed for this purpose, and in addition to heating the storage tanks, this unit also supplies the steam needed to bring the asphalt to mixing temperature. With the installation of the new equipment, a new 200-hp. boiler will be put into operation.

Crude asphalt, Col-Provia and fuel oil are delivered to the plant by truck, and are pumped directly into their respective tanks from these carriers. From the individual batchers and mixers, the material is discharged directly into either company-owned or customer-owned trucks, and is then hauled to the job site. The plant is now operating at capacity and is, in fact, turning away customers. Many of the small villages around Quincy, a suburb of Boston, use the company's asphalt. The quality of the product is attested to by the volume of business handled.

As is the case in such installations, there is dust present. In this operation the dust is put to work, since it forms a highly-desirable ingredient of the asphalt mix. A cyclone dust collector recovers dust from the plant operation so that it may be injected back into the flow of material, and batched out in the asphalt.

The company is very proud of the small but completely-equipped machine shop on the premises, which is capable of handling any repairs that may become necessary. The program of new construction—the installation of the new weigh-batching plant, drier, and mixer, with essential accessories, is under the supervision of the personnel of this shop.

Officers of the company are John Fairfield, president; H. G. Fairfield, treasurer; A. L. Cassere, assistant treasurer and general manager; and Edward Morton, plant superintendent.

• Truck positioned to receive a load from the one-ton mixer above. In the background is the oil-fired dryer.

Pennsylvania Glass Sand Corp. Acquires Mill Creek Sand Co.

Acquisition of the Mill Creek Sand Company's facilities in the Arbuckle Mountains of southern Oklahoma by the Pennsylvania Glass Sand Corporation was recently announced.

The Pennsylvania concern, whose offices are in Lewistown, Pa., is currently engaged in greatly expanding its capacity. Plans are being made for even more extensive expansion in the future, to accommodate the growing demands of the glass industry.

Agricultural Limestone Plant In Iowa Has 40 Years' Supply

A new industry has been launched near Burlington, Ia., for the production of agricultural limestone. The new concern, known as the Neosho Valley Rock Company, is owned by Frank J. Pecka Sr. and his sons, Milo and Frank J. Jr. The extensive limestone deposit on the Pecka farm is expected to contain a 40 years' supply.

A fleet of seven Diamond T trucks will haul and spread the agstone for local customers.

New Sulphur Shipments Up According to Bureau Report

The tonnage of native sulphur mined during the first quarter of 1948 was 22 percent greater than in the first quarter of 1947, according to the U. S. Bureau of Mines. Mine shipments increased 2 percent and apparent sales 7 percent. At the end of the quarter stocks were 7 percent lower than on March 31, 1947. Sulphur production during March exceeded the February output by 4 percent and mine shipments increased 26 percent, whereas apparent sales were 7 percent lower. Stocks increased 19,602 long tons during the month.

the lime plant operator

PIT AND QUARRY

by WOLF G. BAUER
Consulting Engineer

DRYING PROBLEMS IN THE LIME AND ALLIED MINERALS INDUSTRIES. PART I. BASIC CONSIDERATIONS

another P&Q exclusive

MUCH of the subject matter treated in The Lime Plant Operator department of PIT AND QUARRY during the past years has been presented from the fundamental as well as the practical operation angle. In that way, it was hoped, operators processing other nonmetallic minerals would also find items of interest and application to their own industries. Many of the basic unit processes and operations concerned with quarrying, crushing, grinding, feeding, plant economics, control, fan technology, fuel preparation and burning, heating and cooling, etc., apply in some measure to allied mineral industries. Thus we must consider the subject of drying as of general interest, rather than a specialized topic such as lime calcination or hydration.

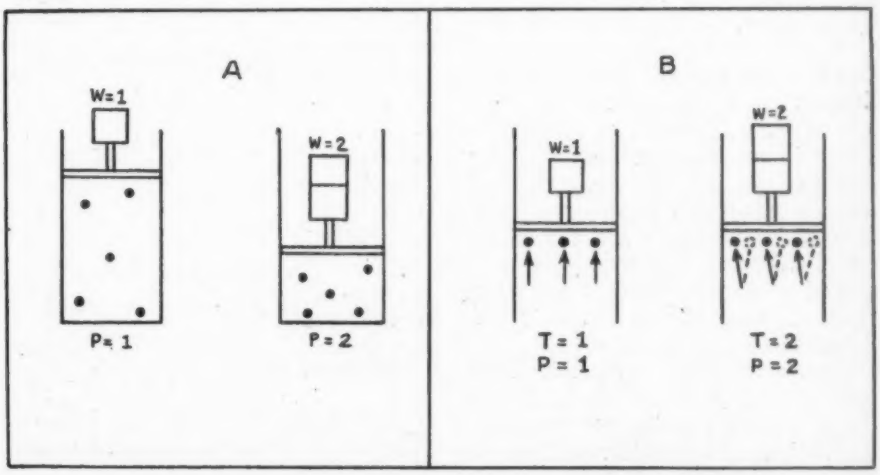
Unlike formulations applying to rates of calcination of lime, dolomite, gypsum and the like, it is impossible to present or use simple empirical formulae or equations applicable to drying rates and drying behavior. Since drying rate is not only dependent on temperature and vapor pressure conditions, but also on the physical nature of the material, no hard and fast rules will apply.

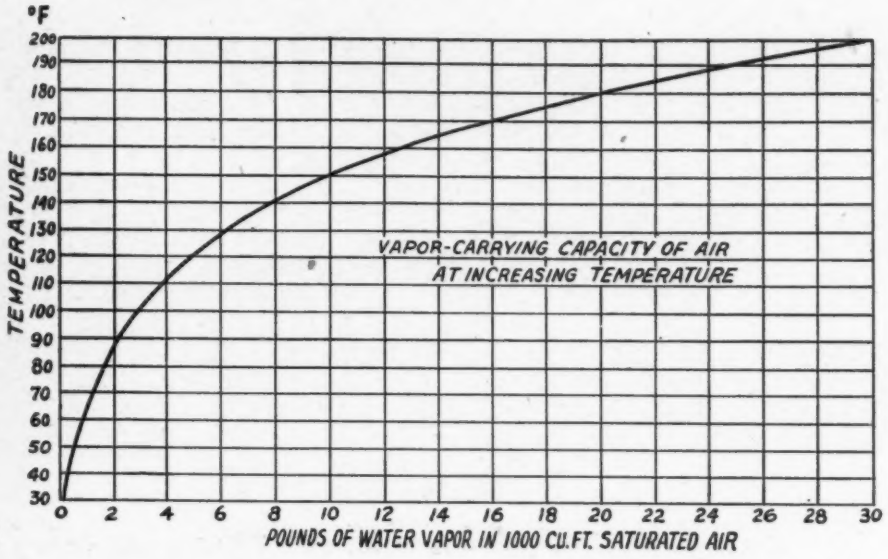
Drying Applications There are indeed very few mineral processing operations today which do not include a drying stage or phase at some point in the manufacture or operation. The lime industry is no exception. Drying becomes necessary, either from an economic standpoint in bettering crushing, grinding, burning, screening, or dust collecting processes, or it is dictated by product specifications and requirements. Thus in the manufacture of lime products, the drying of quarried, crushed, waste, washed or damp reclaimed stone, sticky sludges or sandy marls may be carried out between stages of crushing, screening and grinding. Lime may be hydrated at low temperatures with excess or cooling water, and then dried with recuperated excess process heat before cooling. Precipitated whiting or lime carbonate is dewatered and then dried in suspension during disintegration, or in rotary tumbling cylinders. Such slurries may also be atomized and dried with hot gases in spray driers without intermediate dewatering. Drying of lime from wet dust collectors can be done with waste heat or the material can be re-mixed with hot lime in hydrators. In the preparation of various solid fuels drying plays often a most important role, not only from the standpoint of improving burning efficiency, but also as a medium facilitating subsequent grinding and reduction thereof.

Mechanics of Evaporation Every individual gas in a mixture of gases exerts its own pressure, this pressure being directly proportional to the volume which the gas occupies in the mixture. This is called its partial pressure. At the interface between the water surface and the air, water molecules bounce out of the liquid bond and intermingle at great speed with the gas and water molecules. In this free state, the intermolecular attraction is rather weak, and the molecules of water are said to be in the vapor or gas phase. They may strike the surface of the water and re-enter the liquid in their high-speed erratic paths. When there are enough water molecules in the air so that as many re-enter as leave the liquid surface, the liquid-gas system is in equilibrium, and we say that the air is saturated. Under this condition, no more evaporation takes place.

Gas pressure, as we will remember, is actually the manifestation of

• Pressure can be increased by reducing the volume of the container (A) or by increasing the temperature (B).




°F
TEMPERATURE
VAPOR-CARRYING CAPACITY OF AIR AT INCREASING TEMPERATURE
POUNDS OF WATER VAPOR IN 1000 CU.FT. SATURATED AIR

the frequent impact and collision of gas molecules with the walls of the vessel containing the gas. In keeping this picture in mind, it can readily be concluded that the gas pressure can be increased by adding more molecules of the particular gas in question or by reducing the confining space, causing more frequent molecular impacts. (See Figure A.) The same effect of higher pressure can also be achieved by speeding up (raising the temperature or energy) the movement of the molecules. (See Figure B.)

In most drying operations, the pressure of the drying air remains atmospheric and more or less constant, because drying is not carried out within gas-confining walls. Thus an increase in temperature, rather than raising the pressure (increasing the contact frequency and energy or the molecules), will reduce the actual number of H_2O molecules contained in unit space of air, and so allow more water molecules to be taken up or evaporated. The higher the temperature of the air, therefore, the greater its water-carrying capacity. That this is not a straight-line function can be seen from the curve above.

Drying Stages In earlier discussions on convection heat transfer, the importance of gas velocity in relation to heat transfer rate was stressed. In the process of water evaporation from a wet surface, the same forces and conditions also hold true. We are again concerned with the stagnant adhering layer or film of gas covering the liquid or solid surface.

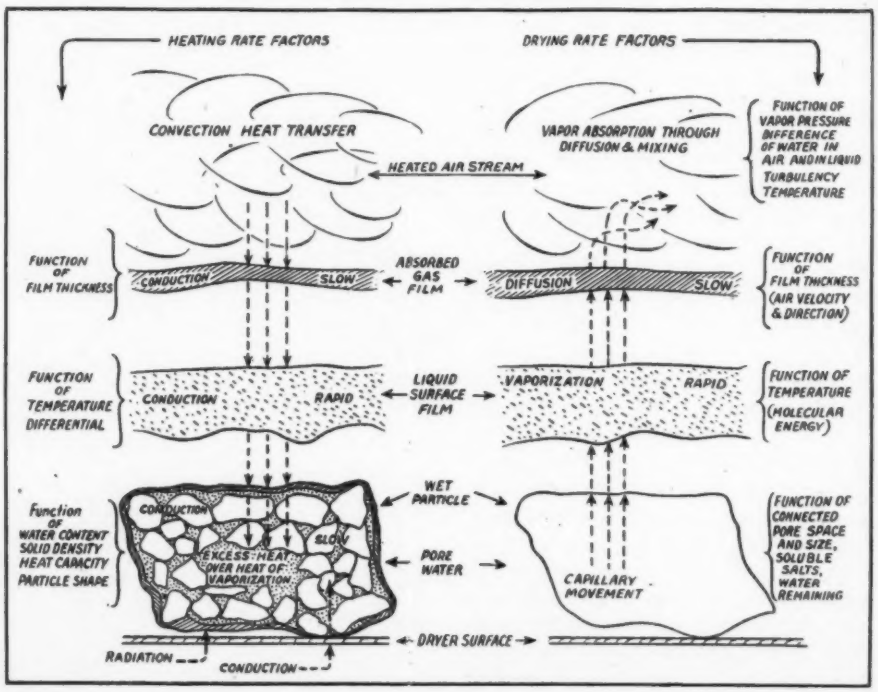
Two processes are operative: heat transfer and evaporation. In drying the wet solid rapidly, the water at the surface of the solid must first be heated in order to increase the evaporation rate. So we have, first of all, heat transfer by convection. It has already been shown in earlier discussions, that this heating rate is gas film at the surface through the dependent on the thinning of this scrubbing action of the moving gas film against it. The heat (vibration energy of the molecules) then travels by conduction from the moving hot gas stream through the gas film to the liquid or solid. Similarly, the water vapor passes from the wet surface through the adhering film by diffusion to the moving gas stream outside. Again, as in the case of heat transfer, the thickness of this film influences the rate of gas passage.

A third factor, however, now enters the picture in drying. Not only must the water on the surface of the solid be vaporized, but the water contained in the pores of the solid must also be eliminated. As the surface water is removed, interior or pore water is pulled toward the surface by capillary forces. As long as this condition obtains under normal or atmospheric drying pressures, the solid material and water remain at a relatively low temperature, irrespective of the temperature of the hot drying gas. When the water at the surface of the solid evaporates faster than it can be replenished by pore water from the interior, then the temperature of the solid surface begins to rise, and the vaporizing front recedes into the interior of the particle, both liquid and gas diffusion becoming operative simultaneously through the solid pore space.

It becomes obvious that the drying rate of a solid can be divided into two periods or stages, the surface drying, and the pore drying stage. These are often referred to as the constant-rate, and the falling-rate periods.

Surface-Drying Stage This phase of drying is generally the initial stage. It may be absent if the material had a dried exterior and contains only interior pore water. The term "constant-rate period" refers to this stage because of the uniform speed of vaporization when outside conditions of temperature, vapor pressure, and gas velocity are constant. When these are not constant, evaporation proceeds in proportion to tempera-

• Schematic diagram illustrating drying stages.



ture and air velocity, and inversely as the water vapor pressure in the drying gas mixture. The rates increase with increase in temperature, and tend to follow more an exponential law.

From these relationships it becomes apparent that maximum drying rate during this period requires high temperatures, high air velocity and turbulency, and large quantities of air. A more detailed discussion of these factors is indicated.

1. High Temperatures: High temperature energizes the water molecules to a point where it disrupts the liquid bond, thereby releasing the molecules in the vapor or gaseous state. The higher the temperature, the quicker is this heat of vaporization absorbed, and the more excess heat remains to heat up the liquid phase. Higher temperatures also allow radiant heat transfer to come into play, heat transfer which is not dependent on the thickness of the adsorbed gas film surrounding the wet solid. Heat transfer by conduction between the material and the hot surfaces of the dryer may, in some instances, play a considerable role at high temperatures.

High temperature also increases the vapor-absorbing capacity of air as explained earlier, and thus lowers the air requirements for drying.

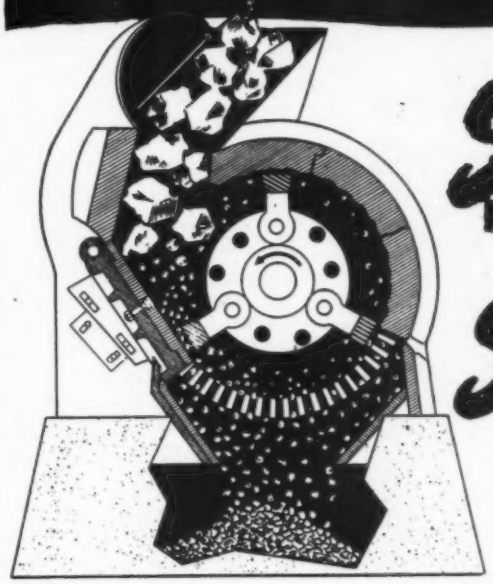
2. High Air Velocity: In scrubbing away or thinning the saturated stagnant gas film from around each piece of materials, high velocity air impingement is required. High gas velocity also speeds up the drying rate due to turbulency. If the air in contact with the moist material were stagnant, water vapor would be absorbed into the air by slow gas diffusion. Turbulent motion provides rapid mixing of vapor with air, and thus raises the evaporation rate.

3. Differential Vapor Pressure: This is the basic driving force determining evaporation rate. The greater the difference between the partial pressure of water vapor in the air to that of the escaping vapor in the liquid, the more rapid the change of state. Rapid drying, therefore, calls for large quantities of low-humidity air. Of course, it is not economical to make use of only a portion of the water-carrying capacity of air, as too much work must then be expended, and the drying apparatus would become too bulky and costly when velocities are held low. Generally it is considered good practice to exhaust air which is at least 75 percent or more saturated at the exhaust temperatures. The curve shows the relationship between temperature and the amount of water the drying air can hold at the saturation point.

Pore Water Drying Stage Time and temperature are the two determining factors influencing the drying of solids in this final stage of the process. Since the quantities of water exaporated per unit time are not as great during this period as they are in the initial stages, complete removal of the pore water is best done at temperatures as high as allowable without injury to the material.

Complete removal of the pore water is often not economical or even desirable, as some materials may re-absorb some of their pore water as hygroscopic water up to 15 percent by weight. The nature of the material and the manner of heating and drying are closely related. This phase of the subject will be taken up in the next issue.

DAY PULVERIZER-CRUSHER



Shatters MAN-SIZE STONE IN Seconds!

This sectional view of the down-running DAY swing hammer Pulverizer-Crusher manufactured by Brooks shows how most of the reduction is done before the rock reaches the grate bars.

● Hundreds of users all over the world report that dollar for dollar their DAY Pulverizer-Crusher outlives and outproduces other machines of this type because — (1) it's faster — designed to completely shatter man size stone in a matter of seconds . . . up to 75 tons per hour capacity, — (2) it's heavier — extra sturdy, massive and compact, and yet — (3) it is more readily accessible because of its simple design. Other advantages include extra take-up holes, interchangeable manganese steel side liners, reversible swing hammers, reversible screen bars, reversible rotor and many other maintenance-saving features.

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JOHN S. WILDE, general quarry foreman of the Inland Lime and Stone Company has been awarded a Certificate of Honor by the Joseph A. Holmes Safety Association for exceptional success in supervisory work in connection with prevention of accidents. This was announced by James Boyd, director of the U. S. Bureau of Mines and president of the Joseph A. Holmes Safety Association, following the annual meeting of that association in Washington, D. C.

The award was made to Mr. Wilde for supervising the operations of a quarry for eighteen years without the occurrence of a fatal accident.

LEON D. HOLDEN of Forty Fort, Pa., has been appointed project engineer with the Lehigh Portland Cement Co., starting June 1. For the past two years he was director of the Cement, Lime and Allied Plants Division of the Vulcan Iron Works, Wilkes-Barre, Pa. A native of Endicott, N. Y., Mr. Holden received the degree of civil engineer from Rensselaer Polytechnic Institute.

MISS BEATRICE G. GAY has been elected secretary-treasurer of the National Crushed Stone Association.

Officers of the newly opened Gordon Quarry, Inc., Oregon, Mo., are RUSSELL GORDON, president; CONNIE GORDON, vice-president; and ALBERT RICHARDSON, secretary and treasurer. The quarry started operations May 20.

MELVIN H. BAKER, president of the National Gypsum Company, has been elected president of the Delaware Avenue Association Inc. of Buffalo.

EDWARD J. NUNAN, sales engineer for Buffalo Slag Co. Inc., has been appointed co-chairman of the Industrial Division of the Canisius College Building Fund in Buffalo.

R. KIRBY SHIRLEY has been elected executive vice-president of Freeport Sulphur Company by the board of directors and Pearson E. Neaman, vice-president and general counsel, Langbourne M. Williams, Jr., president, announced today. Mr. Shirley and Mr. Neaman were also elected directors.

Mr. Shirley, a native Texan, started with Freeport in 1922. He was elected treasurer in 1934 and vice-president and treasurer in 1940. Mr. Neaman, a New York attorney, joined the Freeport organization in 1930 as secretary, and was elected a vice-president in 1945.

JAMES J. RYAN of Kenmore, N. Y., has been appointed manager of gypsum, lime and steel products sales for the National Gypsum Company. His duties will include intergrating the sales effort in this group of products, representing about 70 percent of the company's total production.

Mr. Ryan has been with the company since 1934. During the war he represented the industry on the War Production Board and later with the office of Price Control.

LAWRENCE RICE, safety engineer of the Nazareth Cement Co., at Nazareth, Pa., was recently awarded a Red Cross certificate for meritorious service as chairman of the first aid committee of the cement company. Lincoln Smith, first aid chairman of the Easton Area Red Cross Chapter, made the presentation.

At the director's meeting of the Canada Crushed Stone Ltd., Hamilton, Ont., the following officers were elected: ALAN V. YOUNG, president; R. G. L. HARSTONE, vice-president and managing director and D. E. STEELE, secretary-treasurer.

National Cut Stone Ltd., Hamilton, Ont., elected R. G. L. HARSTONE as president, R. K. CUNNINGHAM as vice-president and general manager, D. H. HENDERSON as chairman of the board, and D. E. STEELE as secretary-treasurer.

R. G. L. HARSTONE was elected president, ARTHUR MICHIE vice-president, D. E. STEELE secretary-treasurer and MRS. O. L. BOEHMER assistant secretary treasurer of the Queenston Quarries Ltd.

JOHN M. GAROUTTE, veteran production man of many Henry J. Kaiser enterprises, has been named works manager of the world's largest cement plant at Permanente, Calif.

Simultaneously, it was announced that HOWARD CHURCH will succeed Mr. Garoutte as works manager of the company's alumina plant at Baton Rouge, La., where the latter has served since 1946.

Mr. Garoutte joined the Kaiser organization in 1942 as engineer in charge of ironwork construction for the company's lime, sugar rock, and batch plants. He later participated in the construction of the magnesium plant at Permanente, and then moved on to Permanente Metals' plants at Moss Landing and Natividad, Calif. He was project engineer and general superintendent of both operations.

Subsequently he was assigned to start operations at the Baton Rouge works, and was responsible for Kaiser's first venture in the South. He recently completed supervision of a million-dollar dock project at the Louisiana plant.

Mr. Church has been with the Kaiser organization in an administrative capacity for several years. He was previously located at Permanente as magnesium plant superintendent during World War II, and was transferred to Baton Rouge last year to conduct special development and research work.

TOM DAVIS, who has been connected with the Permanente Cement Co., Los Altos, Calif., in a supervisory capacity, was recently transferred to Honolulu, T. H., to become plant superintendent of Permanente's packing and distributing plant. FRANK E. JUSTICE is division manager at Honolulu.

C. G. DANDROW, vice-president of Johns-Manville Sales Corporation and general sales manager of the company's Industrial Products Division, has been elected President of the Massachusetts Institute of Technology Alumni Association, it has announced. Mr. Dandrow resides in White Plains, N. Y. Orville B. Denison, '11, Gardner, Mass., was chosen vice-president of the Association.

T. C. CARTER, vice-president of the Eagle-Picher Company, has been elected president of the National Mineral Wool Association.

V. N. REITZE was recently elected president of Superior Portland Cement, Inc., to succeed the late E. P. Lucas. Also elected were N. H. NELSON, vice-president and general manager; J. B. LOUGHARY, secretary and sales manager; and H. E. THOMPSON, treasurer.

HARRY E. CARNEY JR., president of the Carney Company, Inc., Mankato, Minn., has been named winner of the "Book of Golden Deeds" award, presented annually by the Mankato Exchange Club to the person who has rendered the most outsanding and unselfish service to his fellow citizens.

Mr. Carney is president of the 65-year-old company bearing his name, which manufactures mineral wool insulation and masonry and rock products; he is also president of the Carney-Pacific Rockwool Co. of Longview, Wash., which shortly will begin manufacturing insulation.

JAMES A. GISH JR., who retired on April 1 as manager of Lehigh Portland Cement Co.'s Sandt's Eddy plant, was honored by the American Society of Mechanical Engineers at a testimonial dinner. Mr. Gish became general manager of the plant in 1925. He entered the cement industry in 1902, when he joined the engineering department of the Edison Cement Co., New Village, N. J.

In succeediing years he was identified with the Bath Portland Cement Co. and the United Kansas Portland Cement Co. in supervisory capacities and for seven years was assistant chief engineer of the Fuller Engineering Co., Allentown, designers of cement and lime kilns and crushing machinery.

Three executive appointments are announced by The Celotex Corporation.

GILBERT J. HAAN has been named assistant vice-president. He will assist C. G. Muench, vice-president in charge of engineering.

Mr. Haan was formerly works manager of the E. W. Bliss Company's Brooklyn, N. Y., plant and prior to that was with A. B. Dick Company and Foote Brothers Gear and Machine Works, both of Chicago.

WILLIAM M. MCNEIL has been appointed production manager for the Gypsum and Mineral Wool Division. The position is a newly created one, made necessary by The Celotex Corporation's rapid expansion in the past two years.

M. C. OLSON, heretofore acting manager of the Roofing Allied Products sales department, has been appointed manager of that department.

HENRY THORNE, employed at the Kerlinger plant of Pacific Coast Aggregates, Inc., San Francisco, is the oldest worker in point of service with the company. He was recently honored by the firm's management with the award of a gold 40-year service pin.

SHERMAN W. COMPTON of Martinsburg, W. Va., has been employed by the West Virginia Department of Mines as quarry inspector, to fill the vacancy created by the death of Estel Thomas of Alderson.

L. C. HAMILTON has been appointed traffic manager of the Huron Portland Cement Company, as announced by P. H. Townsend, vice-president and general manager.

Appointment of GEORGE F. FRANKLAND as Chicago district manager, Johns-Manville Industrial Products Division, was announced by C. G. Dandrow, vice-president and general sales manager. Mr. Frankland succeeds Corydon H. Hall, who resigned on April 1.

WILLIAM S. HOUGH, formerly manager of the chemical and aviation sections of the company's special industries department at New York, will assume Mr. Frankland's former duties in Chicago as assistant district manager, Industrial Products Division.

CARROLL NORDEAN has been promoted from surplus property manager, to assistant purchasing agent and manager, surplus property division at Mobile, Ala.

JOHN W. HAND was promoted from technician in the central laboratory to assistant in the executive office, Denver, Colo.

AUWELL FOGARTY has been appointed assistant to F. T. Wiggins, vice-president, Western Region, Universal Atlas Cement Company, United States Steel Corporation subsidiary, effective February 1, 1948.

LUCIEN EATON, consulting engineer, has been named chairman of the Mining Standardization Correlating Committee of the American Standards Association, to succeed Daniel Harrington. Mr. Eaton has been a member of the committee since 1927. During the last few years he has been active in investigations of mining problems abroad.

LEONARD T. BEALE, president of the Pennsylvania Salt Manufacturing Company, was elected a member of the National Industrial Conference Board at its 29th meeting, held recently in New York.

MRS. HORTENSE EPLING, president of the Epling Sand & Gravel Company, Gallipolis, O., was recently elected president of the Business and Professional Women's Club of that city. Mrs. Epling has conducted the sand-and-gravel business since the death of her husband.

obituaries

WILLIAM J. MUHLITNER, president of the Great Lakes Foundry Sand Co. died May 10.

THOMAS J. JOHNSTON, 74, widely known gravel business operator in the area of Grand Haven, Mich., died on May 1 after suffering a heart attack.

He began work when a young man on government dredges, worked on a U. S. lake survey and was in the contracting business before he organized the Johnston Gravel Co. in 1921.

CHESTER E. RAHR, 67, former president of Certain-teed Products Corp., died on May 16 in a New York hospital after a four-month illness. A native of Wakefield, Mass., Mr. Rahr worked as a telegraph operator and in a Boston brokerage office before entering manufacturing with J. & W. Bird of Boston, producer of building materials. This firm became the Flintkote Co., manufacturer of roofing and asphalt products.

Mr. Rahr was president of Flintkote for several years until 1932, when he left to become vice-president of Certain-teed. Soon thereafter, he became president. Since resigning in 1936, he had been a business consultant on general manufacturing problems with the Great Lakes Carbon Co., New York.

OVAL S. GREGORY, 48, electrical foreman and chief electrician of the Dewey Portland Cement Co., died May 27 at Mercy Hospital, Davenport, Ia., as the result of a heart attack. Born in Raymondville, Mo., in 1899, he came to Davenport in 1927.

CLINTON J. WALKER, employee of the Papay Quarry at Slatedale, Pa., died on May 28 as a result of injuries sustained in a rock slide. He succumbed at Palmerton Hospital 12 hours after he had been pinned beneath the slide.

EDWARD G. BROWN, who conducted the Milwaukee office of the Janesville Sand and Gravel Co. for 24 years before his retirement in 1936, died at his home in Milwaukee, Wis., on June 10. He was 88 years old.

RALPH CLAYTON, 23, pump man at the B. G. Hoadley quarry north of Bloomington, Ind., was killed on May 7 as the result of a 50-ft. fall from the top quarry ledge. He was a World War II veteran.

LIVINGSTON BRUNS YOURTEE, better known as "Bud" Yourtee, general manager of the Yourtee-Roberts Sand Co. of Chester, Ill., died at his home in Lake Providence, La., on May 3 of a heart attack. He was 46 years old.

BENEDICT A. SHEA, district sales representative for the Keystone Cement Co., died May 15 at St. John's Riverside Hospital, Yonkers, N. Y. He was 53 years old, a veteran of the first World War.

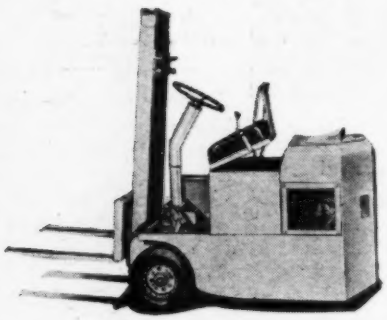
W. A. STOCKER, 89, former superintendent of the Hyatt School Slate Company and a slate inspector for the federal government, died at his home here May 22. He is survived by a daughter, two grandchildren and a sister.

new machinery and supplies

PIT AND QUARRY

● Hydraulic Fork Truck

Powered by a two-cylinder, air-cooled, 10-hp. engine, the Buda "Chore Boy" fork truck has a capacity of 2,000 lbs. The lift and tilt mechanism is fully hydraulic, with a 10 deg. forward and 5 deg. backward tilt. An outside turning radius of 58 inches provides easy maneuverability, while the overall width of 32 inches permits travel down narrow aisles and in and out of box cars.



Turns in intersecting aisles of 57 inches can be made. Motion from forward to reverse is changed by using the clutch pedals. Four speeds are provided for both forward and reverse.

In addition to the standard pedal-type foot brake, an automatic brake is self-applying whenever the operator leaves the seat, thus eliminating creeping and crawling when the Chore Boy is parked on irregular surface or inclines. Tires are of the heavy-duty puncture-proof cushion type. The Buda Co., Harvey, Ill.

● Conveyor Belting

Hewitt Rubber Division of Hewitt-Robins Inc. is again producing its "Maltese Cross" conveyor belting, out of production during World War II.

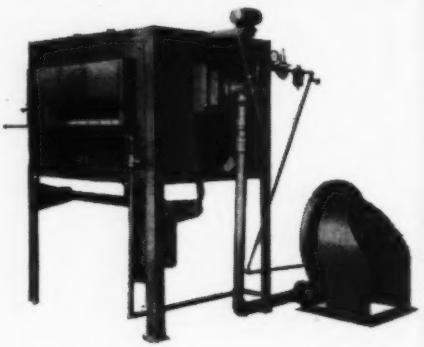
Constructed of especially tough rubber compounds securely bonded to a premium quality, high-tensile cotton carcass, Maltese Cross belting is designed to provide extra strength, greater flexibility and longer life due to features such as an extra-tough cover, which seals the inner carcass of the belt against penetration of moisture and other harmful materials that cause deterioration; special rubber compounds which offer maximum resistance to abrasion; anti-mildew treatment of entire belt and a "Dura-Bond" breaker strip that permanently anchors the cover to the carcass.

Maltese Cross elevator belting is supplied in both standard and shock-pad construction—in all widths and plies with special construction available for hot materials handling.

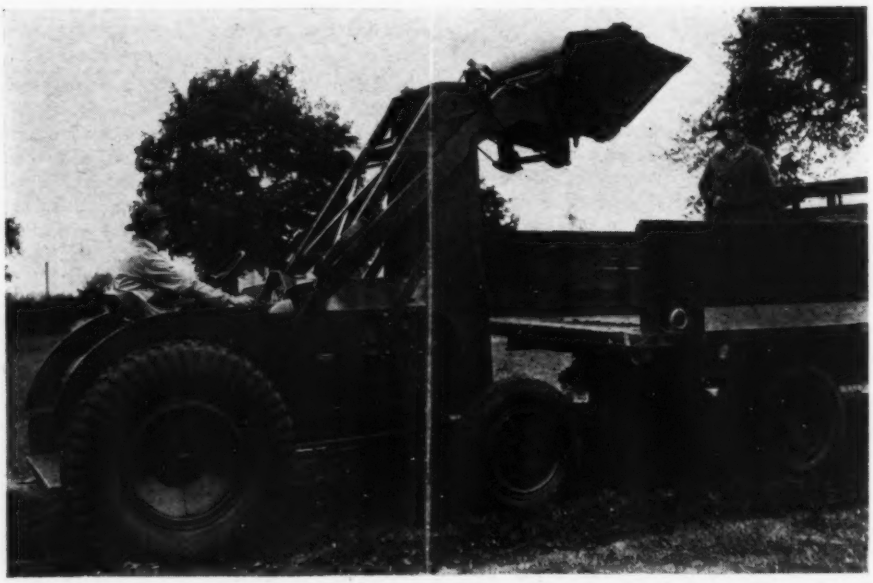
● Rock Bit Forge

An oil- or gas-fired forge designed for heating operations involving detachable rock bits (thread forming, hot milling or heat treating) is offered by the Denver Fire Clay Company.

According to the manufacturer, the forge, which is comparable to a slot-type furnace, performs satisfactorily at temperatures up to 1,900 deg. F. Its slot opening, 4½ by 28 inches wide, is covered by a door which can be raised for charging operatings or when steel is being heated for thread forming. The door has a small opening (4½ by 8 inches) with a steel flapper for convenience in charging or discharging bits during hot milling and quenching operations.



The forge is an over-fired, down-draft, semi-muffle type, supplying uniform hearth temperatures regardless of door position. It operates under a slight positive pressure at both high or low burner positions. The hot gases are spread by means of a flame spreader; they leave the furnace through a vertical flue, built into the wall, after they have accomplished their purpose. Heavy structural steel and reinforced plate are used to encase the refractory.



The Lessmann Manufacturing Company, Des Moines, Ia., cites the following features for its new improved Lessmann shovel unit:

Strong main frame; forming one solid structure with the uprights; front axle of 2½- by 5-in. solid steel; Timken wheel bearings; heavy-duty differential, with full-floating axles; V-8 Ford truck motor (100 hp.), special front power take-off to the lifting hoist; triple V-belt drive; Ford heavy-duty truck transmission with super low and special auxiliary transmission; five speeds; tires—rear, 1200—24 Road Builders, six-ply; front 700—20 truck and bus, eight-ply.

NOW

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MOTOR CONTROL CENTER

Self-enclosed interchangeable units give you . . .

MORE COMPACT ARRANGEMENT

REDUCED MAINTENANCE

GREATER FLEXIBILITY

These new starting units come in four sizes to fit a wide range of motors. You can plan your own motor control center by simply taking an inventory of your motors and then adding up the space sizes of the starters needed.

Let us send you our publication GEA-4979 which will give you detailed description and ordering information. Fill in the coupon and mail it to us. Apparatus Department, General Electric Company, Schenectady, New York.

GENERAL ELECTRIC

Apparatus Department
Section No. CC676-262
General Electric Company
Schenectady 5, N. Y.

Thanks . . . I'd like to have your publication GEA-4979 on the new G-E Motor Control Center. Will you please address it to me as follows:

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● Motor Control Center

A new motor control center which makes possible controlling any number of motors rated up to 200 hp. at 440 volts from one central location, has been announced by the Control Divisions of the General Electric Co. It is designed so that all connections can be made from the front, thus permitting the centers to be lined up against the wall or in back-to-back fashion to conserve space.

These control centers consist of standard starter units which are slid into vertical, cabinet-type sections. The sections are 90 in. high, 20 in. wide, and 12 in. deep. The starters are furnished in five different sizes. Each starter is a complete, fully-enclosed unit which can be arranged within the vertical sections to suit the requirements of the user.

Power connections to the starters are made by contacts which grasp vertical busses in the rear of the sections when the starters are slid into place. Control interconnections to other motors and controls are made through a special wiring trough, with a removable cover, which runs the length of the section. All wiring can be done from the front without disturbing the starters.

Each starter has a built-in circuit breaker for short-circuit protection. These breakers are interlocked so that the doors of the sections cannot be opened when the power is on. General Electric Co., Schenectady 3, N. Y.

● Worm-Driven Clamp

A worm-driven hose clamp, known as the "Aero-Seal" is produced by Breeze Corporations, Inc., 41 South Sixth Street, Newark 7, N. J. It is sturdily built of rust resistant stainless steel or carbon spring steel, with a mechanically interlocked saddle. It is vibration-proof and unaffected by high or low temperatures and pressures.

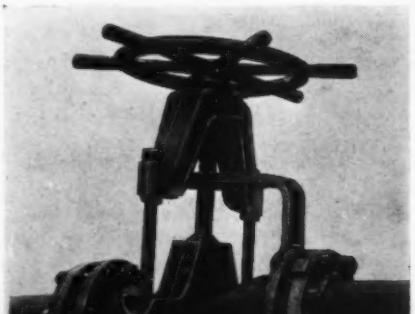
The "Aero-Seal" is designed for use with air, fuel and coolant lines on trucks, tractors, pumps, mixers, compressors, power shovels and other such types of equipment.

Pinch Valve

Massco-Grigsby pinch valves, produced by the Mine and Smelter Supply Company, Denver, Colo., are made in eight sizes. The sleeve (or body) is of hand-moulded natural rubber, reinforced with fabric and capable of withstanding pressures up to 100 p.s.i. (Neoprene sleeves can be furnished if desired.) Recesses in opposite sides of the sleeve interior serve as "hinges" during compression. This feature is said to prevent undue strain and eliminate breakage or excessive wear.

On valves 3 inches in diameter and larger the sleeve is belled on both ends to fit between the split flanges, forming a perfect seal. A metal ring is moulded into the belled ends for added strength and rigidity.

Cast steel split flanges are made to match standard pipe flanges, to be bolted



to standard flanges on the user's pipe line. Flanges on the 10-in. and 12-in. valves can be supplied for either standard (125 p.s.i.) or extra heavy (250 p.s.i.) fittings.

A heavy steel bracket bolted to the flange holds the valve closing mechanism. On the 8-in., 10-in., and 12-in. valves, two stems with chain and sprocket drive and protecting cover are provided, forming a reduction unit.

● Crawler-Crane

Simplicity is the keynote of the Unit "514" design. It is equipped with an 8-cylinder, heavy-duty industrial engine rated at 67 hp. at 1550 r.p.m. Power is transmitted through a worm-driven power take-off. Splined and heat-treated alloy steel shafts, supported by anti-friction bearings, are used throughout. Full vision on the crawler cab meets the demand for automobile-type enclosure for the operator.

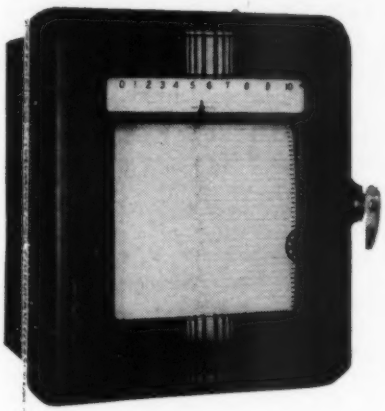
Versatility is reflected in the fact that the Unit 514 is quickly converted to such attachments as shovel, clamshell, magnet, dragline, trenchoe, backfiller, or grapple. Change from one attachment to another can be made on the job by an ordinary mechanic. It has a capacity of 5 tons when used as a crane. As an excavator its capacity is ½ yd. Unit Crane and Shovel Corp., Milwaukee 14, Wis.

● Electrode for Welds

A new electrode, "Hobart Softcast A," is a copper-nickel alloy electrode having a mineral flux coating for metallic arc welding. The yeld deposits are non-ferrous, light grey in color, malleable, easily machinable and have a tensile strength equal to good cast iron. The electrode is especially adapted to the welding of cast iron where the weld area must be machined, drilled or tapped anywhere in the weld zone. These electrodes are available in 3/32, 1/8, 5/32 and 3/16-in. diameters in 18-in. lengths, center brushed. The Hobart Brothers Co., Hobart Square, Troy, O.

● Gas Flue Analysis Recorder

As a means of checking on combustion efficiency in furnaces and boilers, Micromax Oxygen Recording equipment, developed by Leeds & Northrup, is being used to handle many applications which are beyond the scope of CO_2 recorders. Used as a guide to regulating excess air in furnaces such as glass tanks, cement



kilns and open-hearth steel furnaces, it is also a means of checking combustion in boiler furnaces which fire several different fuels simultaneously or in succession.

Micromax Oxygen Recorders operate on the thermal conductivity principle. Analysis for oxygen is accomplished by the "hydrogen-difference" method, which consists of adding hydrogen to the gas sample, removing oxygen by combustion, and electrically comparing the conductivity of the sample before and after oxygen is removed.

Because all parts which contact gas are made of glass, the equipment is corrosion-proof and stable in calibration. The Micromax recording instrument can be either of two models. One offers extra visibility of scale through a round-chart Micromax; the other, a strip-chart model, gives a highly detailed record. Leeds & Northrup Company 4934 Stenton Avenue, Philadelphia 44, Pa.

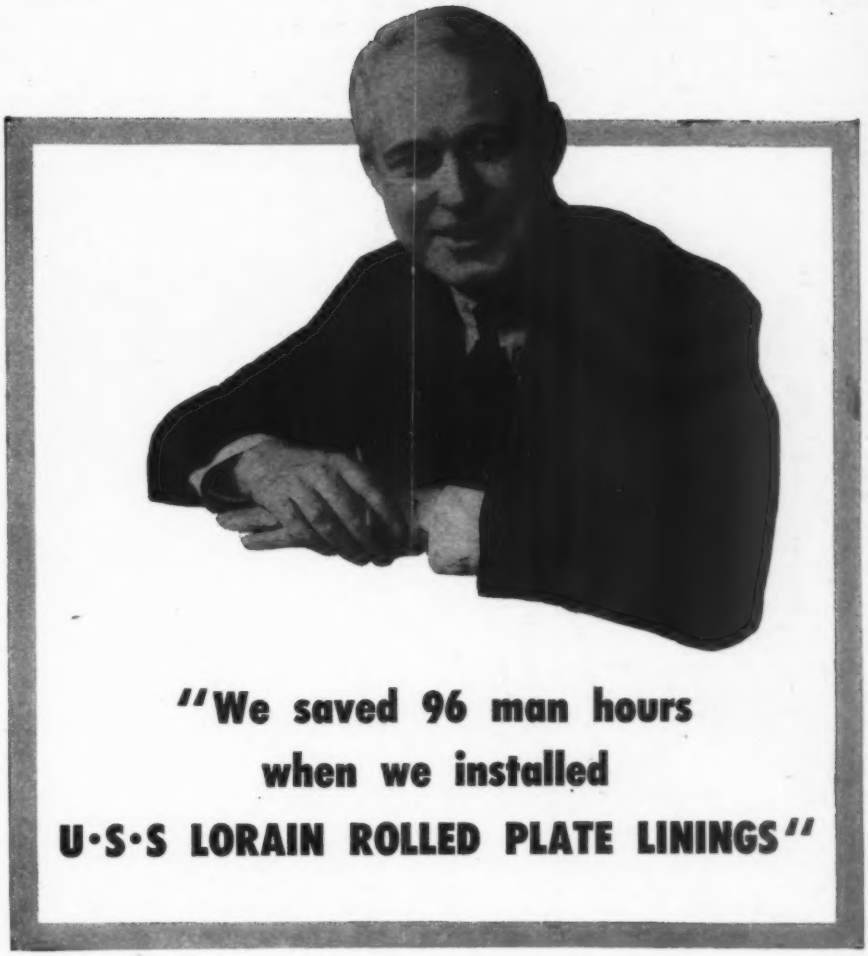
● New Line of Trucks

Three new power plants have been announced by the Ford Motor Company for the 1948 trucks.

These engines are the Rouge 226, a completely new six-cylinder, 95-hp. truck engine; the Rouge 239, an improved V-8 100-hp. engine, and the Rouge 337, a new heavy duty V-8 power plant developing more than 145 hp. for the largest trucks ever built by Ford.

All engines have heavy-duty oil bath air cleaners, pressure-sealed cooling systems, and new weather-proofed ignition systems with automatic spark control which is regulated by engine load and speed.

The three engines also have new distributors and wiring, conveniently located for easy servicing. Valve springs are shot-blasted and rust-proofed. The valve seat inserts are of hard molybdenum chrome alloy. The precision type crankshafts are oversize, as are the connecting rod bearing inserts. Higher-capacity generators deliver maximum out-



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So reports a mill using U·S·S Lorain Rolled Plate Linings. But the savings in installation time they afford are but one reason for the popularity of these plate linings. They actually *stay in longer*. And—because they have high abrasion-resisting qualities, have plate and lift bars that are reversible and lift bars that are renewable at partial lining costs—*they help cut maintenance costs.*

The exceptional strength and toughness of U·S·S Lorain Plate Linings enable the use of thinner plates, thus increasing mill diameter and output.

This superior plate lining is available in the diameter, length and thickness best suited to your operating conditions. It will produce better results, more economically, no matter what you grind. For specific answers to your grinding problems, we shall be glad to supply the names of grinding mill manufacturers who distribute U·S·S Lorain Plate Linings.

U·S·S LORAIN GRINDING BALLS

—forged from new steel, they are accurately heat-treated to obtain hardness of maximum penetration combined with toughness to resist breakage. Standard sizes are available from ¾" to 5" in diameter.

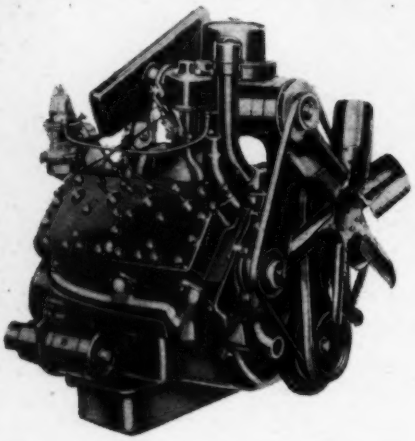
USS STEEL UNITED STATES STEEL

CARNEGIE-ILLINOIS STEEL CORPORATION
Pittsburgh and Chicago
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York
8-106

UNITED STATES STEEL

put at low engine speeds. There is a new high-volume replaceable-element oil filter.

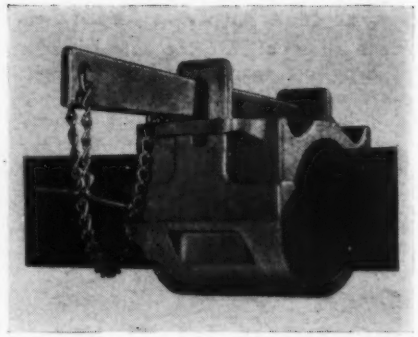
A feature of the new Ford six-cylinder engine is the aluminum alloy pistons which are longer and plated to resist wear. These pistons have four rings above the wrist pin for maximum oil economy and minimum friction losses. The compression ratio, 6.8 to 1, produces more power and a new high-lift camshaft opens valves wider and faster, resulting in more efficient intake and exhaust. The 100-horsepower engine now has accessories conveniently grouped on top easy servicing as well as many other new features.



The new Ford light trucks have direct action shock absorbers. Wider axles permit shorter turning and ample chain clearance. Straight-through mufflers reduce back-pressure, improving engine performance.

● Flexible Coupling

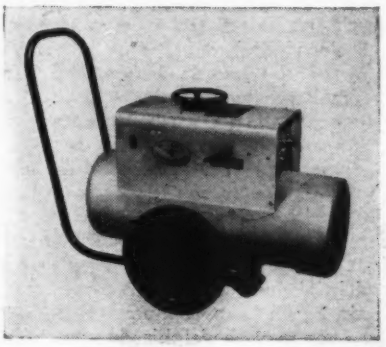
"Presto-Lock" flexible pipe couplings, manufactured by Drinkwater, Inc., Waukegan, Ill., are said to give 40-degree flexibility at each coupling. Since the installation of the device requires no bolts or wrenches, the manufacturer points out, any workman can perform it in a few minutes. He merely gives the wedge key a few taps with a hammer after inserting it in the slots.



The unusual flexibility of Presto-Lock gives it the features of a sleeve, elbow and ball union. Sizes up to and including 3 inches are supplied with chain assembly and one wedge key; sizes from 4 inches through 16 inches have two wedge keys and no chain. Corrosion-resisting malleable iron is used throughout, and special pressure-tight gaskets effect a secure seal.

● Arc Welding Machine

The Wilson Welder and Metals Company, Inc., has announced the new Wilson "Hornet" 36A motor generator arc welding machine. Of compact design and available in 200, 300 and 400 ampere models, it is a heavy-duty machine

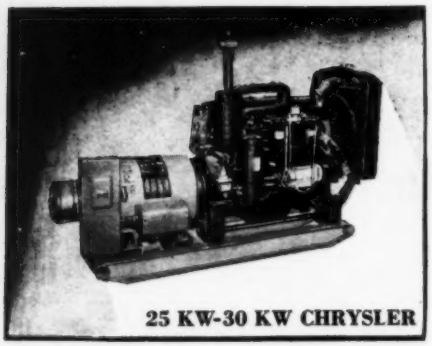


with simple control of current which is easy to adjust and pre-set. It is smaller in size, weighs one-third less than the previous "Hornet" models, and is designed for either 220 or 440 volts operation with no change in relays or additional wires required for voltage reconnection. Wilson Welder and Metals Company, Inc., Dept. 1609P, 60 East 42nd Street, New York 17, N. Y.

● Electric Generator

A 20,000 watt Ford V-8-powered electric generator is manufactured by K. R. Wilson Co. of Buffalo, N. Y. The engine, which develops 100 hp., has flyweight aluminum pistons and a cast iron head. Cooling efficiency is accomplished with a 19-in. fan and a Ford-bus-size radiator. Included in the unit are exhaust manifolds, air filter with suction crank case ventilating device, battery, starter, generator, bus-size oil rectifier, and a governor with double V-belt drive.

The control panel is mounted in a streamlined cast aluminum cabinet



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This listing represents only a small portion of our stock. If the set you need isn't listed, Ask For It.

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DIESEL GENERATING SETS

3 KW Witte, single phase, 60 cycles, 120 volts, 850 R.P.M.

5 KW Hobart Witte, single phase, 60 cycles, 110 volts, 720 R.P.M.

7½ KW Hobart Witte, 3 phase, 60 cycles, 220 volts, 720 R.P.M.

20 KW Hercules D0OC, single phase, 60 cycles, 220/440 volts, 1800 R.P.M.

25 KW Chrysler—3 phase, 60 cycles 220/440 volts, 1200 R.P.M.

30 KW Chrysler—3 phase, 60 cycles 220/440 volts, 1800 R.P.M.

50 KW Gen. Motors—3 phase, 60 cycles 220/440 volts, 1200 R.P.M.

75 KW Gen. Motors—3 phase, 60 cycles 220/440 volts, 1800 R.P.M.

250 KW Gen. Motors—3 phase, 60 cycles 220/440 volts, 1200 R.P.M.

Benjamin's For Motors

3124 Mill Ave Brooklyn, N. Y

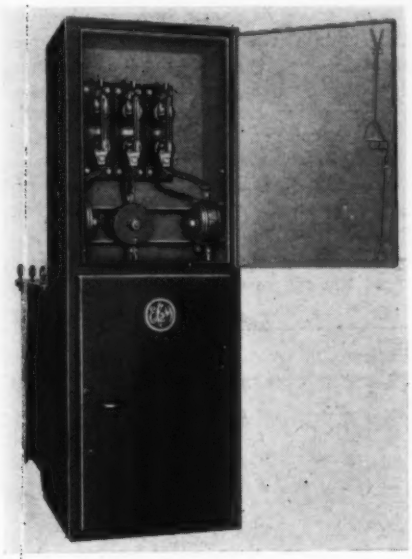
mounted on the generator. Built into the unit is a safety device which automatically stops the engine if oil pressure goes below six pounds, if water temperature exceeds 200 degrees F., or if the generator exceeds 250 volts. K. R. Wilson Co., 215 Main St., Buffalo 3, N. Y.

● Motor Starter

Developed for the protection of high voltage motor circuits against damage from short circuits, The Electric Controller & Mfg. Co., of Cleveland 4, Ohio, has announced a new line of starters for use with 2300-4600 volt motors.

Known as Valimitor (Volt-ampere-limitor) Motor Starters, they are designed for use at any point on any power system regardless of the available KVA.

These new starters limit the maximum fault current that can be obtained on any system to approximately 25,000



KVA, which is easily interrupted by the magnetic contractor used in these starters. All apparatus on the system back to the power source is likewise subject to reduced stresses.

Valimitor Motor Starters are built to provide across-the-line starting, also in the reduced voltage starting style. 2300 volt top ratings are 600 HP for 60 cycle systems and 300 HP for 25 cycle systems. On 4150 and 4600 volt systems, top rating is 600 HP for 60 cycle service and 250 HP for 25 cycle operation.

Agricultural Station Bulletin Traces W. Va. Lime Resources

Bulletin 329, published by the West Virginia Agricultural Experiment Station, Morgantown, W. Va., is devoted exclusively to a report on lime supplies in the state. It contains information obtained by C. E. Stockdale.

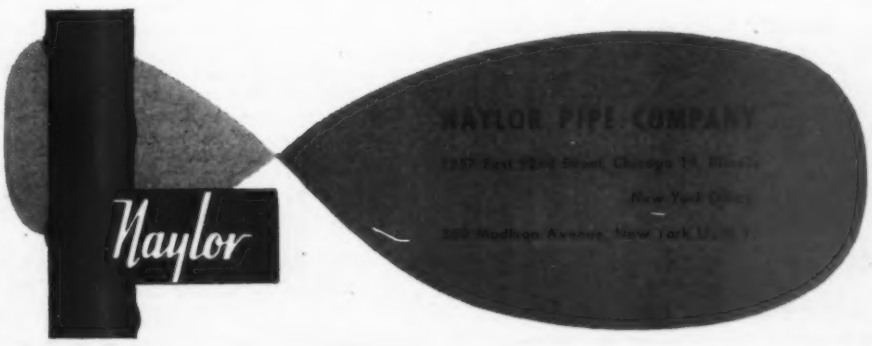
Abundantly illustrated with photographs, graphs and drawings, the monograph presents a detailed picture of West Virginia's lime resources. The use of charts and tables give ample evidence of the careful research which preceded the publication of the report.

It's NAYLOR *Light-weight* PIPE

Here's the one light-weight pipe built to handle both high and low pressure jobs in mining service. The exclusive Lockseam Spiralweld creates a reinforcing truss that increases collapse strength and thus makes Naylor stronger and safer than ordinary light-weight pipe. That's why mine operators prefer Naylor for permanent as well as temporary lines. Sizes from 4 to 30 inches in diameter.

Coupled with NAYLOR *Wedge-Lock Couplings*

Another NAYLOR contribution is the Wedge-Lock Coupling—the last word in speed, simplicity and economy of pipe connection. Built in one piece with gasket in place, it can be quickly and easily connected or disconnected by means of a hammer. Two types—for high or low pressure service.



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STEEL DROP BALL

NOW — a new design. Cable replacements minimized. Forged connecting link, protected by deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Furnished complete as shown.

Deliveries prompt.

For further information write—

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legal decisions

By LEO T. PARKER

Recently a reader wrote, as follows: "Our company purchased a power shovel for digging gravel. We paid $1,500 down and agree to pay the balance in $1,000 monthly installments. We missed a payment and without any notice to us the seller took possession of the shovel and then notified us that he was keeping the $1,500 we paid down and $3,000 we paid in monthly installments. Can you assist us to win this suit? Please cite a few law cases so we can know our obligations when signing contracts."

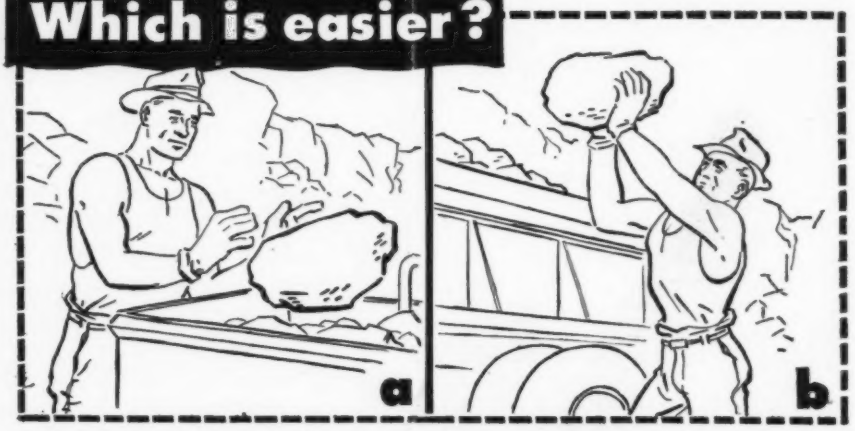
The answer to this question depends upon the contents of the sale contract.

According to a recent higher court a seller may repossess equipment from a purchaser who defaults in making monthly payments. And he may do so without giving the purchaser any notice, if the contract of sale clearly gives the seller this privilege.

For illustration, in *Geroy v. Upper*, 187 Pac. (2d) 662, the testimony showed the facts, as follows: On May 1 the Nelson Equipment Company contracted in writing to sell to the Mill Company a certain diesel engine. The sale price was $4,898, payable $1,698 cash and the remainder in ten equal monthly installments of $320, with interest. Title to the engine was reserved in the contract by the seller until paid for, with the right by the seller to take possession of the engine *without demand or notice*, if the purchaser defaulted in making any monthly payment. After the purchaser defaulted in making two payments the seller sued to gain possession of the engine. The higher court held:

"The seller had the option either to treat the sale as absolute and sue to re-

Which is easier?



You're right! Illustration "A" is the easy way to load rock. It's unnecessary for loading crews to waste energy throwing or shoveling rock up into the high body of a truck. The extra lifting that kills loading crew efficiency is eliminated by the Dempster-Dumpster System which brings the body down to the men. Any number of waist-high bodies are placed where needed, then, as a body is loaded, a truck hoisting unit picks it up, hauls it, dumps it, and returns the empty for reloading (See action pictures at right). There's no wasted time for truck or crews . . . only a continuous cycle of loading and hauling. Cost of installing the Dempster-Dumpster System is amazingly low. Write for catalog 247 today.

DEMPSTER DUMPSTER

TRADE MARK REG.

258 N. KNOX, KNOXVILLE, TENNESSEE

cover the remainder of the sale price or to regard it as canceled and take possession of the property."

Also, this court held that the seller was within his legal rights in repossessing the engine without giving the purchaser any notice. This court said:

"The contract specifically permitted him to do so without demand or notice to the buyers, and, therefore, no demand or notice was necessary."

$10,500 Damages

According to a recent higher court a lessee of machinery must make all rental payments as agreed, or the owner may immediately take possession of the machinery and the lessee must pay all future monthly payments specified in the rental contract.

For example, in *Williams Factors, Inc. v. Phillips,* 190 Pac. (2d) 189, the testimony showed facts, as follows: The Williams Factors is the owner of a 1½-cu.-yd. Lorain Model 77 shovel with 45-ft. dragline boom, together with fairleads and powered by a Caterpillar engine. It leased the shovel to one Phillips by written lease for 12 months.

The lease contract provided that if Phillips missed one payment the owner could repossess the shovel. The contract stated that Phillips would pay $6,000 in advance and pay $1,050 a month for twelve months. Phillips paid $6,000 in advance, and paid $1,050 a month for two months and then missed the third payment.

The Williams Factors filed suit and the higher court held that it could take possession of the shovel at once and Phillips must pay the balance due on the lease contract of $1,050 per month for 10 months, or $10,500.

Guarantee Disclaimed

If a seller of used equipment disclaims a guarantee the purchaser cannot expect to win a suit although the equipment is worthless.

For illustration, in *Lent v. McIntosh,* 186 Pac. (2d) 626, it was disclosed that a gravel company purchased a used diesel caterpillar tractor, model RD-8, with bulldozer and accessories for $6,000. The contract of sale contained this clause: "Purchaser agrees that he has examined the property here described and is using his own judgment as to its condition, fitness and value, that the seller makes no representation, statement, warranty or guaranty as to its condition, or with reference to said property; that the execution of this contract is not procured by any statement, representation or agreement not herein contained, and that each and every condition and agreement relative to the subject matter of this contract is contained herein."

After Lent had the tractor a few days he discovered that the engine had cracks in the cylinder walls and otherwise the tractor was in very poor mechanical condition.

Lent sued the seller and alleged that the seller *verbally* represented that the machine was in operating condition and that certain cracks in the drive case were surface scratches only and did not,

WHIPPING A LIMESTONE LAYER
How to get under a ledge of limestone slabs to dredge the deeper, rich deposit of coarse sand and gravel . . . Terry Carpenter, Ltd., at Scottsbluff, Nebraska, solved this problem easily with an Eagle "Swintek" Dredging Ladder. Designed to dig at below water level depths of from 35 to 42 feet, this 50-ft. ladder maintains an average flow of from 90 to 135 yards of material per hour to the shore plant where it is processed into concrete brick, block and tile; ready mixed concrete; or sold as sand and gravel.
Shown here in the raised position, the ladder features a long-serving Amsco manganese steel travelling chain that loosens and agitates the deposit after digging through the limestone and keeps oversize out of the system. Get your production up and costs down—send for Catalog 745.
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Against a background of buttes, Terry Carpenter Ltd. . . . one of hundreds of deposits made profitable only through the use of the Eagle "Swintek".
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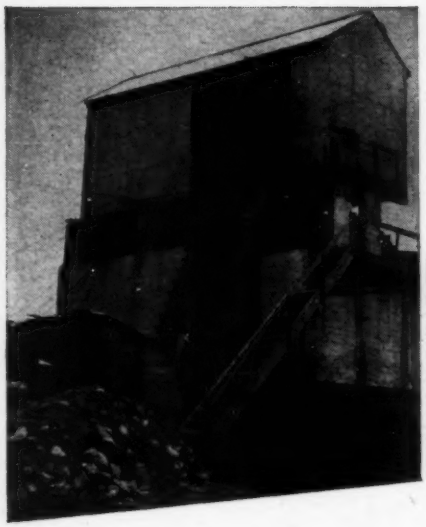


Below: Deister 3' x 8' four-deck Vibrating Screen atop the crushed stone bins of the Independent Sand and Gravel Company, Inc.

Left: Washed gravel plant showing conveyor which carries material to the Deister 3' x 8' Screen located in the top building.

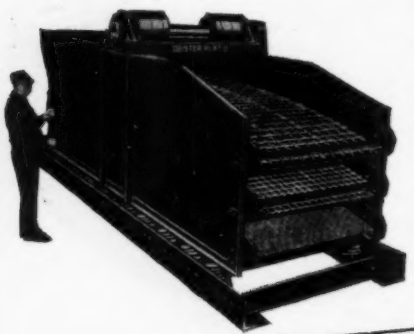
Seven Years of Operation ...one bearing replacement

Two Deister Screens have given Independent Sand & Gravel Company, Inc., Newtown, O., a combined total of nearly seven years of reliable operation . . . with one bearing replacement and routine screen cloth changes the only maintenance.

John Fogle, general manager, says: "The two Deister Screens we have are doing a very good job on both screening and maintenance. We have only had one bearing to replace in four years. When we replace either of the screens, it will be with another Deister."

One of the 3' x 8' four-deck screens handles the primary screening job in the washed gravel plant, producing around 60 tons per hour of 1½-inch, 1-inch, torpedo and sand. The second Deister Screen handles the output of the crusher in the crushed stone plant, approximately 40 tons per hour.

The efficiency and low up-keep of Deister Vibrating Screens has been cited many times by statements such as Mr. Fogel's. Their rugged, all-welded construction, with only two bearings, assure maximum production and minimum maintenance throughout long service life. For complete information, write the Deister Machine Company.



DEISTER SCREENS

DEISTER MACHINE CO.

FORT WAYNE 4, INDIANA

in any manner, affect the operating efficiency of the tractor.

Nevertheless the higher court refused to hold the seller liable, saying:

"When a seller and a buyer deliberately enter into a contract wherein the seller positively and expressly refuses to give any warranty, and the contract is not induced by fraud, no warranty of any kind can be implied by law."

Also, see *Getty v. Jett Ross,* 23 Wash. (2d) 45, 60; and the case of *Smith v. Bolster,* 125 P. 1022. The testimony in these cases showed that a seller represented to a purchaser that certain equipment was in good operable condition and that it was a "faily good" machine. This court refused to hold the seller liable on a guarantee, saying that the seller only *praised* his merchandise and *did not guarantee* it.

Be Careful

According to a recent higher court buyers of used equipment must be very careful to avoid financial losses.

For illustration, in *Universal Credit Corporation v. Victor Motor Company,* 33 So. (2d) 703, the testimony showed that one Robert purchased a motor truck and gave a chattel mortgage to the seller in Mississippi. Before Robert had paid the entire purchase price he took the automobile from Mississippi into Louisiana and sold it for cash.

The higher court held that the seller in Mississippi could recover possession of the automobile from the last purchaser in Louisiana.

This court also explained that if the truck had been driven from Mississippi with knowledge of the seller, then the latter could *not* have taken possession of the truck from the last purchaser in Louisiana.

Fair Labor Standards Act

All employees who handle, sell and distribute merchandise received *in interstate commerce* are entitled to wages specified by the Fair Labor Standards Act.

In *McComb v. Herlihy,* 161 Fed. (2d) 568, the testimony showed that a company maintained an office in South Carolina and the *greater* part of its materials was purchased in that state. But approximately 20 percent of the goods distributed by the company was purchased outside of South Carolina and shipped into the state by rail, truck or express.

In holding that the company must pay *all* its employees' wages specified by the Fair Labor Standards Act, the court said that since the employees handled *within* the state of South Carolina *some* merchandise received from *outside* the state resulted in the company being within the scope of the Federal Wage Law.

Check Is Returned

It is well known that an *innocent* holder of a check or negotiable note can receive payment although a serious disagreement arises between the seller or purchaser. Hence, very frequently, the purchaser of merchandise who pays by a check or note finds himself in a bad legal position. This situation arises if

the seller fails to deliver the merchandise or otherwise breaches his contract *after* he sold the check or note to a finance company. Recently a court held that if the finance company *does not* act as legal agent for the seller, the purchaser must pay, but if the finance company acts as agent for the seller, then the purchaser need not pay.

For example, in *Cohen v. Friedberg,* 56 Atl. (2d) 561, the evidence showed that the Slate and Stone Products Company gave a $1,000 check to the Plymouth Steel Company which cashed the check with the National Check Cashing Service, and received $995. They deposited the check and some days later were informed by the bank that the check had not been paid.

The testimony showed that the Plymouth Steel Company had *not* fully complied with its agreement with the slate company which refused payment. The National Check Cashing Service sued the slate company to recover payment of the check.

The higher court held the slate company *not* liable because the steel company had appointed the National Check Cashing Service as its agent to cash checks. The court held that the check company was not holders "in due course" because they were agents of the steel corporation and there had been *failure of consideration* for which the check was given to the steel company.

Contributory Negligence

Under no circumstances may a patron recover damages for an injury in a company's plant caused by a dangerous condition of which he had *knowledge.*

For example, in *Tate v. Canary,* 194 S. W. (2d) 663, it was shown that a customer was injured when he fell down a stairway. He sued the proprietor for damages and alleged that: (1) The stairs were insufficiently lighted; (2) and there was no handrail on the right side of the steps going down, as required by the building code of the city.

However, the higher court refused to allow the patron *any* damages because the testimony proved that he had previously ascended the stairway and *knew* that it was dangerous.

Also, see *Seelbach, Inc., v. Mellman,* 293 Ky. 790. Here a patron knew of the slippery and dangerous condition of steps he was using, but made no effort to use a handrail to alleviate the very danger he knew to exist.

The higher court held that he was guilty of contributory negligence, and *not* entitled to receive damages for the injury.

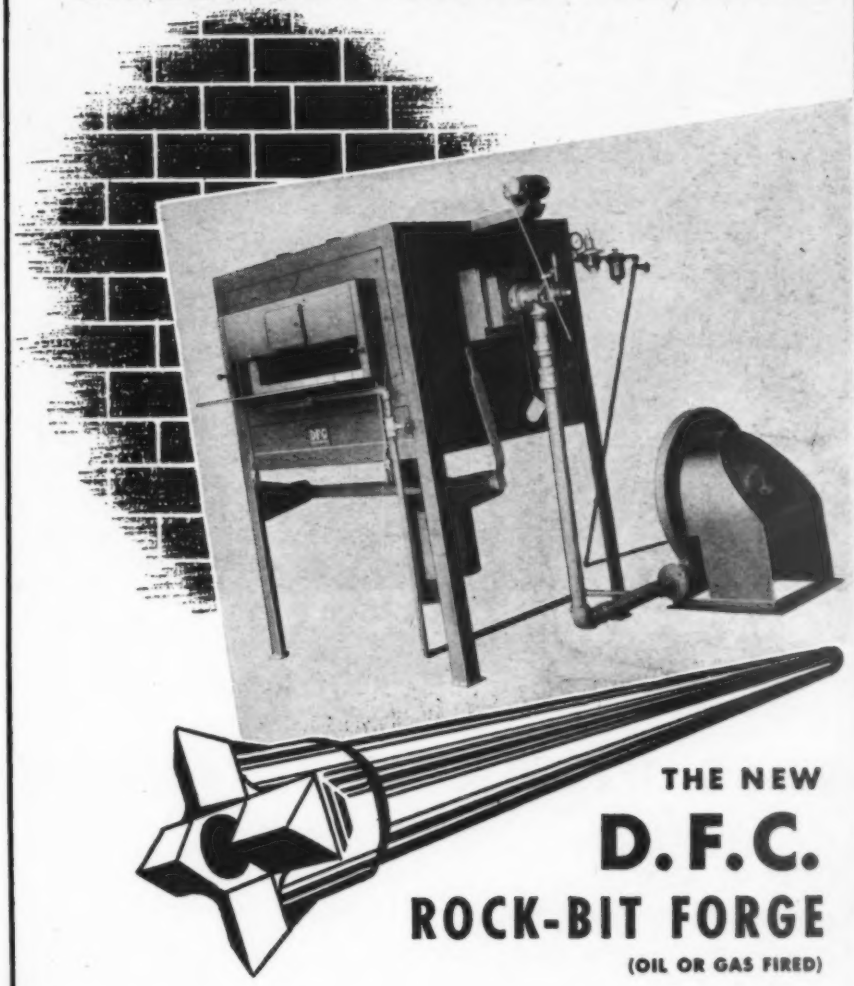
Practical Joke

According to a recent higher court an employee's injury arise out of and in the course of his employment although he may *not* be actually working at the time, if the injury arises from risks which are incident to the doing of the employer's work. Hence employees remain "at work" during "rest" periods approved by the employer.

In *Spencer v. Chesapeake Company,* 47 Atl. (2d) 385, the testimony showed

ROCK-BIT

LIFESPAN LENGTHENED



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ROCK-BIT FORGE

(OIL OR GAS FIRED)

Ideal for any heating operation involving detachable rock bits.

- THREAD FORMING
- HOT MILLING
- HEAT TREATING

- Excellent performance at any temperature to 1900° F.
- Uniform temperatures throughout roomy 27 in. by 24 in. hearth.
- Installation space only 92 cu. feet. (floor space—16 sq. ft.)

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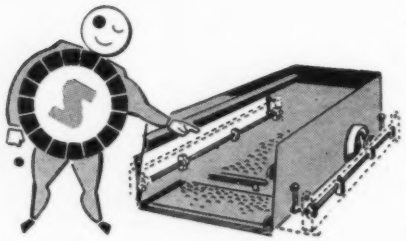
ONLY SECO OFFERS YOU FULLY CONTROLLED TRUE CIRCULAR ACTION . . .



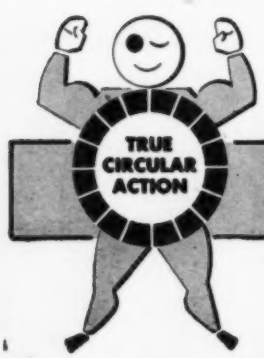
Seco's Patented Equalizer Assembly

● Try to break a swimming record—with watersoaked clothes clinging to your body—holding you back? Ridiculous, yes.

By the same token, if you're expecting to increase tonnages of aggregates screened, you need a vibrating screen that eliminates rocking, bobbing and other things that slow down the load.

You need a Seco Vibrating Screen with fully controlled true circular action—to make every inch of screening surface give top efficiency. Thousands now in use. Deliveries are good. Get the whole story.

Write Dept. L for A Guide to Better Screening



SECO

SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto

that one night an employee fell asleep during a rest period. He was waked up by his pants being on fire. He sustained serious injuries and sued his employer for compensation under the State Workmen's Compensation Act.

During the trial testimony was given showing that *fellow* employees had played a joke on the employee and set his pants on fire. The higher court awarded the employee compensation nevertheless, saying:

"If there was no objection on the part of the employer when the employee rested, these intervals of rest may be considered incidental to the employment and insufficient to establish a termination of the employment."

For comparison, see *Globe Company*, 131 Atl. 760. Here the testimony showed that it was the custom of the employees to leave the shop in hot weather to go outside for fresh air. One day an employee was injured when outside the shop.

The Supreme Court held that the employee was within the course of his employment, though not actually working at the time and therefore entitled to compensation for the injury.

Capital Assets

It 's well known that "capital assets" held for more than six months entitle taxpayers to pay federal income taxes on only *one-half* of this income. Also, only one-half losses may be deducted on capital assets. But capital assets mingled with *ordinary* assets become the latter and the taxpayer must pay full income taxes, and deduct full losses.

For example, in *W. D. Haden Company v. Commissioner of Internal Revenue*, 165 Fed. (2d) 588, the testimony showed facts, as follows: One Haden built a lime making plant at a cost of over $300,000 and organized the Haden Lime Company and conveyed the plant to it for its entire issue of $300,000 of preferred stock.

In subsequent litigation it was shown that Haden acquired a lease on gravel producing land. Later Haden purchased the land. Haden sold the land at a loss. The higher court held that the loss from sale of the land was *all* capital loss and he could not claim a capital loss on the land investment and an ordinary loss on the lease account by abandonment of the gravel, since the lease interest merged in his interest in the land.

Block Falls

Modern higher courts consistently hold that an independent contractor is not responsible for injuries caused persons *after* he has completed his work, and it has been "accepted" by the property owner. Also, a manufacturer is not liable under similar circumstances unless the testimony shows that *his negligence* caused the injury.

Another important point of law is that the owner of a public building is bound to use reasonable care and skill in the maintenance of the building, and he is bound to inspect it from time to time to discover and repair defects. His failure to do so results in *his sole* lia-

bility for injuries to persons.

For illustration, in *Delaney v. Supreme Inv. Company,* 29 N. W. (2d) 754, a pedestrian sued a manufacturer, a contractor and the owner of a building to recover damages for injuries sustained as the result of a block falling from the front of the building. The testimony showed that a general contractor had remodeled the building.

The higher court held that the owner of the building is liable if the testimony shows that his negligence in failing to inspect and repair the loosened block caused the pedestrian's injury.

No Implied Guarantee

It is well established law that a manufacturer *impliedly* guarantees that his product is "reasonably" fitted for use *if* the purchaser notified the manufacturer for what purposes he intended to use the product. Otherwise, there is *no* implied guarantee.

For illustration, in *Zesch v. Abrasive Company of Philadelphia,* 183 S. W. (2d) 140, the testimony showed facts, as follows: A manufacturer sold an abrasive cutting-off wheel. It was not designed for grinding with pressure on its sides. The wheel exploded when being used by the purchaser's employee, who was using it to side grind. The employee lost his eyes and sued the manufacturer for damages, claiming that he *impliedly* guaranteed that the wheel was fit for the intended purposes. The higher court held:

"The evidence does not tend to show that defendant (manufacturer) undertook to furnish the cutting-off wheel for a particular special purpose, and that plaintiff (employee) was relying upon the judgment of defendant that the wheel was suitable for the particular special purpose. Absent such a showing, there was no implied warranty of the suitability of the article sold.

This court also laid down important law to the effect that a manufacturer has no legal duty to subject a product to a rigid inspection or test for *latent* flaws. On the other hand, all courts agree that a manufacturer may be liable for injuries caused by *clearly defective* products.

Trespasser Law

It is well established law that a property owner owes *no* legal duty to protect a trespasser from an injury. Hence, only under exceptional or very unusual circumstances is a property owner liable for injuries to a trespasser.

For illustration, in *MacKenzie v. Angle,* 186 Pac. (2d) 30, one Alexander sued the Dos Palo Company for damages for injuries he received when a plank fell off a building and struck him.

The higher court decided that since Alexander was a trespasser the company could *not* be liable.

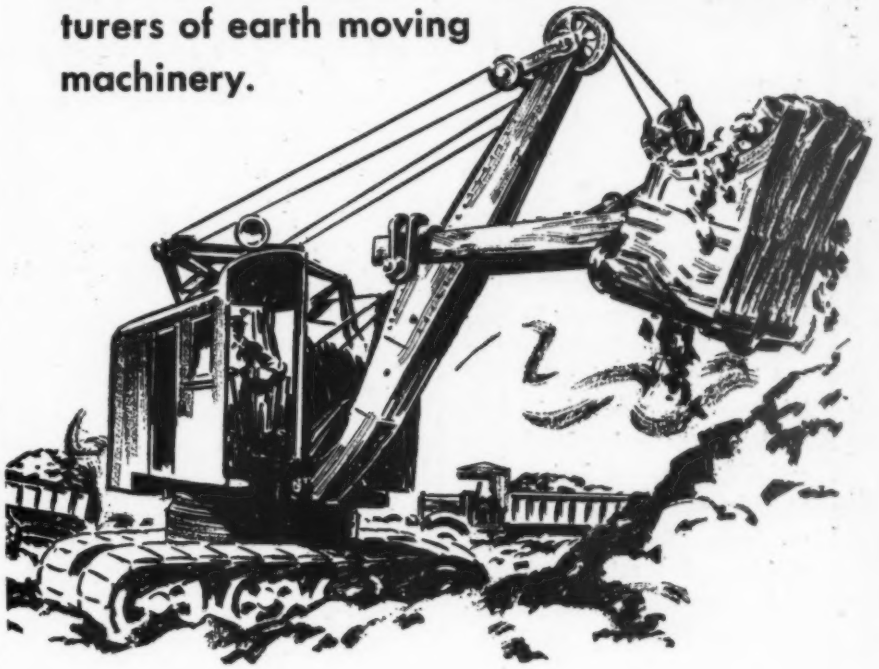
All Equipment Mortgaged

Although a mortgage does not contain a complete list of items, yet the mortgage covers all equipment at the location described in the mortgage or bill of sale.

For example, in *Ferg Drilling Company*

EASY TO WEAR-IN!

J-M INDUSTRIAL FRICTION MATERIALS wear well from the start . . . are specified as original equipment by most manufacturers of earth moving machinery.



HARD TO WEAR-OUT!

J-M INDUSTRIAL FRICTION MATERIALS wear slowly and evenly...are preferred by operators who keep maintenance costs low.

• J-M says "stop" and "go" to more tonnage than any other friction materials.

Replace with J-M Industrial Friction Materials and get better braking performance always. You're sure of long service, high braking efficiency and economical operation. Exceptionally durable, mechanically strong, J-M Friction Materials withstand faster speeds, heavier loads, harder shocks and higher temperatures. See your J-M Friction Material distributor or write Johns-Manville, Box 290, New York 16, N. Y.

JM

Johns-Manville

INDUSTRIAL FRICTION MATERIALS

No. 1 With Leading Manufacturers

K-P *Engineered* WIRE SCREEN

* SIEVING
* SIZING
* SEPARATING

Korb-Pettit Wire Screen is not only first quality in material and workmanship but is engineered for the job involved. Available in High Carbon Spring Steel and Oil Tempered Spring Steel for extreme abrasion resistance. Designed for all types of vibrators and rotary equipment. Request literature.

Wire Screen,
Spiral Woven Wire
Conveyor Belts,
Wire Partitions,
Machine and Window
Guards, Cages,
Enclosures, Grilles, etc.

KORB-PETTIT
WIRE FABRICS AND IRON WORKS
INCORPORATED
Engineers and Manufacturers
1503 No. Mascher St.
Philadelphia 22, Pa.

"KEEPS PROMISES"

v. Harris, 174 Pac. (2d) 262, the testimony showed facts, as follows: A seller sold the Ferg Drilling Company certain equipment on credit. The bill of sale covered a drilling machine, mast, derrick, and contained the words "and all other equipment in connection therewith." The location of the equipment *was given* in the bill of sale. The purchaser gave a mortgage to the seller to secure the purchase price. In this mortgage was listed the items at the well. A "doghouse" and a Hall pump were at the location but *not* listed in the bill of sale.

The purchaser failed to pay the agreed price and the seller sued to foreclose the mortgage and possess all the equipment.

It was contended, since the doghouse and the Hall pump were not described in the bill of sale that the seller could not recover possession of these items. The higher court held that the seller could possess all items, including the doghouse and the Hall pump, saying:

"The pump was a part of the equipment described and, being so, would be within the terms of the bill of sale unless expressly excepted therefrom."

Streets Dedicated

According to a recent higher court the instant a property owner dedicates streets for public use, the purchasers of lots in the subdivision acquires "vested" rights in streets and alleys which *cannot* be closed.

For example, *Gambrell v. Chalk Company,* 205 S. W. (2d) 126, it was shown that a plat of a subdivision was approved by the City Planning Board and filed for record in office of the County Clerk.

The higher court held that the city could not abandon or close the street.

C. K. Williams and Company Merges Six Subsidiary Firms

C. K. Williams and Co., Easton, Pa., producers of crushed terrazzo, colors and pigments, have announced a new service for customers. Effective March 1, 1948, the interests and services of C. K. Williams and Co. and its subsidiaries—the George S. Mepham Corporation, the Point Milling & Manufacturing Company, the Seminole Pigment Company, the Synthetic Iron Color Company and C. K. Williams & Company of California, Ltd.—will be grouped under one corporate name, C. K. Williams & Co.

The principal change will be in the corporate name only—the principal value will be in the product standardization and the closer coordination of all policies and activities of the former subsidiaries.

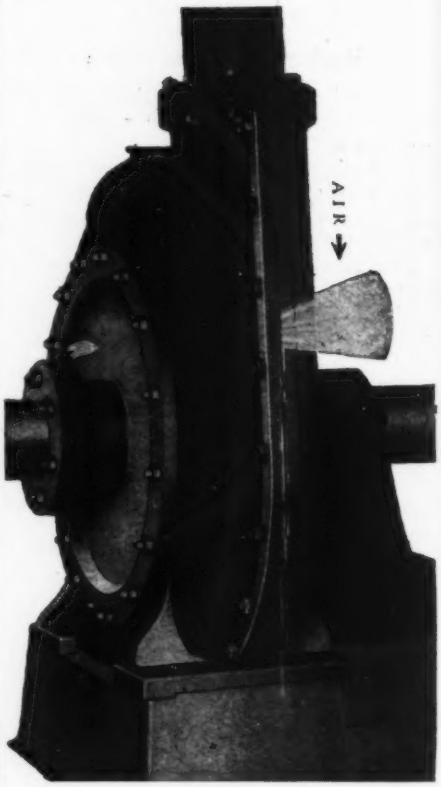
Permanente's Yosemite and N. California Divisions Merge

An announcement released by James K. Beatty, general sales manager for the Permanente Cement Company, reveals that Permanente's Yosemite Division has been consolidated with its Northern California Division. Key personnel has been transferred to the Oakland and Seattle offices of the company.

WE WILL LET YOU WRITE YOUR OWN GUARANTEE

THAT YOU'LL NEVER WEAR OUT a "Tell-Tale" Centrifugal Sand and Gravel Pump Shell!

(Patented)



HERE'S HOW AND WHY—

A length of flax packing is clamped between the halves of the split "Tell-Tale" Pump Shell to form an air-tight joint between the Shell and its Renewable Inner Lining.

When the abrasive action of the sand and gravel, or other materials being pumped, finally cuts thru the tough Shell Liner, (and a few minutes later thru the flax packing) air will be sucked into the nearest port hole in the Shell. (What appears in the picture above to be a spray of water spurting out of the Shell is the artist's conception of air being sucked into it.) This causes the pump to lose its prime and immediately stop pumping materials. It also serves as a warning to the operator that the Shell Liner has worn out.

ASK FOR COMPLETE DETAILS; STATE SIZE PUMP INTERESTED IN AND REQUEST BULLETIN "P" ON AMERICA'S HIGHEST PRODUCTION PUMP.

PEKOR IRON WORKS
DRAWER 909
Columbus Georgia

Trade Notes

Service engineers numbering 165 from 40 states and three foreign countries have attended the distributors service school operated by The Thew Shovel Company at its Lorain, O., plant.

The purpose of the school is to provide the best possible field service for Lorain users, and to make factory-trained service personnel available to them. The course is two weeks long and involves a thorough study of power crane and shovel engineering, design, construction and service.

Announcement is made of the appointment of David S. Price, management and consultant engineer, to represent the Brooks Equipment and Manufacturing Company of Knoxville, Tenn., in the Great Lakes area, effective April 1st. His headquarters will be located at 843 Agatite Avenue, Chicago, Illinois.

Lima Shovel and Crane Division of the Lima-Hamilton Corporation announces the appointment of J. T. Conners of Cleveland, O., as their agent for northeastern Ohio. The Conners Equipment Company's offices are at 851 Leader Building. In addition to the Lima line, Mr. Conners also represents the Insley Manufacturing Corporation and the Owen Bucket Company.

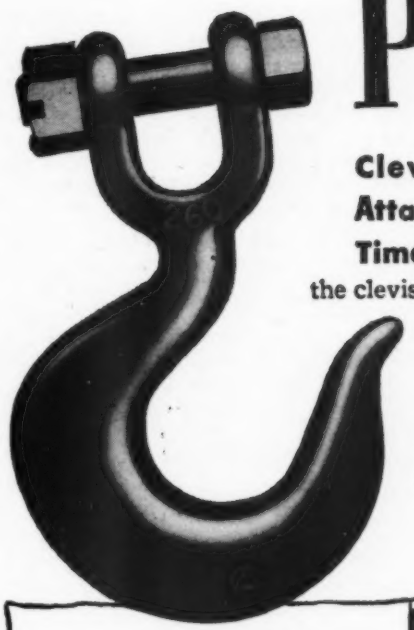
Appointment of J. G. Barta as sales representative of the Upper Midwest area for Diamond Iron Works, Inc., of Minneapolis has been announced by Fred H. Jusenius, vice-president and general sales manager. Mr. Barta will have headquarters at Duluth, from which city he will cover the Iron Range and Upper Midwest section, plus contiguous Canadian provinces.

Appointment of the Fry Equipment Co., 525 South 11th Street, Abilene, Tex., to handle all Davey products is announced by Davey Compressor Co., Kent, O. Dealership territory will cover the following Texas counties: Brown, Callahan, Coke, Coleman, Concho, Eastland, Fisher, Haskell, Howard, Irion, Jones, McCulloch, Mitchell, Molan, Runnels, Scurry, Shackelford, Stephens, Sterling, Stonewall, Taylor, Throckmorton, Tom Green, Erath, Comanche, Hamilton, Mills, Borden, Dawson, Gaines, Andrews, Martin, Glesscock, Midland, Ector, Winkler, Loving, Ward, Crane, Upton and Reagen.

The Fry Equipment Company will handle the complete Davey Equipment line including portable and stationary compressors, Auto-Air and track-air units, truck power take-offs and the Davey Air Chief Model compressors.

C. H. Rieman has been appointed manager of the Gardner-Denver Company branch office in Duluth. Mr. Rieman is assuming the managership formerly held by the late C. L. Kohlhaas.

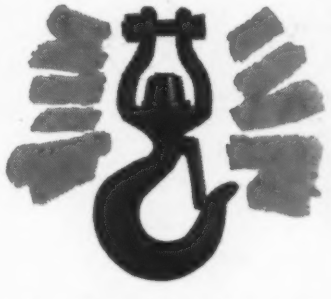
Here are Hooks that hoist your Profits!



Clevis Hoist Hook Is Quickly Attached . . . Changed . . . Saves Time and Labor. Slip the bolt through the clevis, spin the nut, spread the cotter and this heat-treated hook's ready and safe for your toughest jobs. No welding, no spelter, no connecting fittings required. Send for Laughlin's famous data book of industrial fittings . . . Catalog No. 140.

THE THOMAS LAUGHLIN CO., DEPT. 3, PORTLAND 6, MAINE.

Laughlin Safety Hook . . . "The Latch Locks The Load" . . . adds a big safety factor to every lift. Sturdy latch, stainless steel spring. For every industrial application.



Laughlin Replacement Swivel Hook Assembly with Safety Latch. Bolts on and off . . . no machining . . . no threading. For hoists, cranes, lashing operations. One-ton and half-ton sizes.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

GILSON Mechanical Testing Screen

Gives You Fast Accurate Sizing of Test Samples

- Crushed Stone
- Gravel
- Slag
- Similar Materials

The GILSON Testing Screen handles a large and representative sample in three to five minutes. Compact smooth operating unit is designed for testing and research over a wide range from 4-inch to 200-mesh. An attachment for testing sand is optional. You need this practical method of plant control.

8 GILSON FEATURES

1. Makes tests quickly and accurately.
2. Two to seven separations simultaneously.
3. One machine for the entire size range.
4. Screen trays independently removable.
5. Trays adjusted to same tare weight.
6. Visible separation to refusal.
7. Few moving parts to wear out.
8. Engineered for long and practical service.

Write for bulletin and complete details.

GILSON SCREEN CO.
BOX 186 MERCER, PA.

traffic news

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 85263 (2) Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds from Greencastle, Ind., to Scottville, Mich., 281 cents per net ton.

Docket 85283 (2) Proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds to Cannelton, Ind., from Mosher, Ste. Genevieve, Mo., Valmeyer, Ill., 226 cents; Prairie du Rocher, Ill., 215; to Rockport, Ind., from Mosher, Ste. Genevieve, Mo., Prairie du Rocher, Valmeyer, Ill., 226 cents net ton.

Docket 85281 (2) Dolomite, roasted, (refractory dolomite in granular form, treated or untreated, clinkered or burned to a dead state), carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Durbin, O., to Waterloo, Ia., 441 cents per net ton.

Docket 85337 (2) Proposed to establish on crushed stone, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Thrifton, O., to Amesville and Lathrop, O., 127 cents net ton.

Docket 85418 Establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds from Branchton and Osbornes, Pa., to Villa Nova, W. Va., 248 cents per net ton.

Docket 85398 (A) Agricultural limestone, ground or pulverized, only when loaded in box cars. Cancel present commodity rate of 143 cents net ton, published in N.&W. Railroad tariff GF 48-E from Afton, Arion, Batavia, Book, E. Danville, Gernon, Henley, Lawshe, McDermott, Macon, Mineral Springs, Mount Oreb, Mowrystown, New Boston, Newtown, Otway, Peebles, Perintown, Plum Run, Portsmouth, Roca, Sardinia, Seaman, Shimer, Williamsburg and Winchester, O., to Cincinnati, account obsolete. Glass rates to apply in lieu thereof. (B) Limestone, ground or pulverized, unburned, carload, minimum weight 60,000 pounds, establish from Plum Run, O., to Cincinnati, 143 cents net ton.

Docket 85328 (A) Establish on crushed stone, in open-top equipment, carload minimum weight 90 percent of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply from Durbin, O., to Hamilton, Ohio 94 cents per net ton. (B) Establish on agricultural limestone, unburned, in bulk, in open-top equipment, carload minimum weight 90,000 pounds, unless whenever for carrier's convenience a car of less capacity is furnished, in which event the minimum weight will be marked capacity of car used.

From Durbin, Ohio To	Cents per Net Ton
Batavia, O.	116
Cedarville, O.	72
Fort Wayne, Ind.	127
Lebanon, O.	94
Milford, O.	105
Tipp City, O.	72
West Jefferson, O.	83
Xenia, O.	72

Docket 85439 (1) Proposed to establish on dolomite, roasted, (refractory, dolomite, in granular form, treated or untreated, clinkered or burned to a dead state), carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Bettsville, Gibsonburg, Maple Grove, Millersville and Woodville, O., to Muskegon, Mich., 288 cents net ton.

ILLINOIS FREIGHT ASSOCIATION DOCKET

Docket IRC 511-698 It is proposed to establish on limestone, agricultural, (not ground or pulverized), in bulk in open-top cars, carload, from National Stock Yards, Granite City, Venice, Nameoki, Poag and Edwardsville, Ill., to Chicago, Ill. Present: $1.53 per net ton. Proposed: $2.08 per net ton.

Docket ORMV-511-78 Proposed to establish the same mileage scale of rates on ground or pulverized limestone in closed cars, carload, from Mosher and Ste. Genevieve, Mo., to points in Southern Freight Association tariff, as applicable from Prairie du Rocher, Ill.

Docket IRC 511-707 Stone, ground or crushed, chats, rip rap and rubble, in open-top cars, agricultural limestone, in bulk, in open-top cars, carload, from Grafton, Ill., to stations on N.Y.C. in Illinois:

	Proposed Rates	
To (representative)	Crushed Stone	Agricultural Limestone
Charleston, Ill.	138	..
Shelbyville, Ill.	125	99
Pana, Ill.	121	99
Hillsboro, Ill.	106	99
Nameoki, Ill.	88	88
Bethalto, Ill.	94	94

Present: None in effect.

SOUTHWESTERN FREIGHT BUREAU DOCKET

Docket 44885 Establish on limestone, from Mosher and St. Genevieve, Mo., to points in Southern Freight Association territory, the same mileage scale rates on limestone, ground or pulverized, in closed cars, carload minimum weight 60,000 pounds, when in bags and 80,000 pounds when in bulk, as applicable from Prairie du Rocher, Ill.

Docket 44938 (1) Crushed stone, Arkansas to East St. Louis, Ill. Amend Item

1562 Southwestern Line tariffs 162-T, to also apply on crushed stone.

Docket 44981 (1) Crushed stone, Iron Mountain, Mo., to Illinois. Establish rates of $1.33 to Murphysboro; $1.44 to Herrin and $1.50 to Marion and Benton, Ill., per net ton from Iron Mountain, Mo.

DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS

Docket 39793 (c) Establish rate of 520 cents ton (2000 pounds) on gypsum, crude or crushed (not ground) in bulk, carload minimum weight 80,000 pounds from Blue Rapids, Kan., Medicine Lodge and Sun City, Kan., to Ragland, Ala.

WESTERN TRUNK LINE NEW APPLICATIONS

Docket X-E-41-957 It is proposed to establish on stone, crushed, carload, from Sioux Falls, S. D., to Grand Island, Neb., $2.10 per ton of 2000 pounds.

Docket E-41-956 Crushed stone, minimum weight 90 percent of the marked capacity of the car, except that when weight of shipment when loaded to full visible capacity of car is less than 90 percent of marked capacity of car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 pounds per car. From Dresser, Wis., to Mankato, Minn. Proposed—6.5 cents per 100 pounds.

Docket X-E-41-962 Proposed to establish on stone, crushed, carload, minimum weight 90 percent of marked capacity of car, except that actual weight will govern, when car is loaded to full visible capacity, from Atchison, Kan., to Wahoo, Nebr. 151 cents per ton of 2000 pounds.

New Mexico Exploration Increases Potash Supply

Potash reserves in the Carlsbad district of Eddy County, N. M., were increased substantially by Bureau of Mines exploratory work on the United States potash reserve, during World War II, according to James Boyd, director. Sixteen vertical core holes drilled from the surface outlined an estimated reserve of 16,017,290 tons of potash ore averaging 24.73 percent K_2O when using a 5-ft. minimum thickness and a 15 percent lower potash limit.

A copy of Report of Investigations 4098, *Diamond Drilling of Potash Reserves in Eddy County, N. Mex.*, by Walter R. Storms, may be obtained free by writing to the Bureau of Mines, 4800 Forbes Street, Pittsburgh 13, Pa.

Warner Company Honored by Industrial Relations Award

The Warner Co. of Philadelphia has been selected to receive the 1948 Annual Industrial Relations Award. This award is given every year by the Philadelphia Chamber of Commerec to the company with the most outstanding record in developing employer-employee relations.

In receiving the award, Charles Warner pointed out that he was accepting it on the behalf of all Warner employees, for it was their cooperation which had brought about the record so highly commended by others.

See for Yourself...you will find WISCONSIN Air-Cooled ENGINES S-P-R-E-A-D O-U-T All Over the ROAD SHOW!

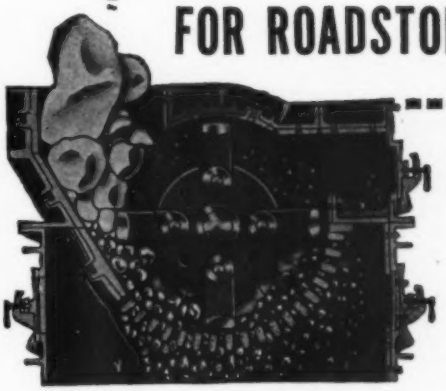
Officially, you will find the complete line of Wisconsin Air-Cooled Engines exhibited in Booth 1017, in the Main Exhibition Hall at the American Road Show, July 16 to 24 . . . and you will receive a most cordial welcome there. Pay us a visit by all means!

Unofficially, however, Wisconsin Air-Cooled Engines will be very much in evidence as *standard power equipment* on a great variety of road and construction equipment exhibited by other manufacturers, spread out all over the extensive Road Show grounds.

Leading manufacturers of heavy-duty machinery, calling for rugged, dependable power, appreciate the on-the-job service value of *"Most H. P. Hours"* . . . as delivered by Wisconsin Engines.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

THE IDEAL CRUSHER FOR ROADSTONE MARKETING... the AMERICAN FRONT FEED ACS



Cross-Section view of American "ACS" Type Hammermill. Note special construction features: Front feed shortens travel of stone in hammer circle, produces minimum fines and a coarser product. Grinder and breaker plates are easily accessible for quick change of product size and to compensate for wear. Built-in trap in upper right corner collects tramp metal.

American ACS Front Feed Crushers are built for high capacity, heavy duty production, with individual size control and easy external adjustments that assure:

- Uniform, cubical runs of desired roadstone, aggregate and base sizes.
- No fingerstones or slivers.

Available with any of three hammer types, American ACS Hammermills are engineered for efficient, rapid crushing of any hardness of stone. Capacities up to 250 TPH.

Write for bulletin: "Better Stone Crushing".

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers
1059 MACKLIND AVE.
ST. LOUIS 10, MO.

IT COSTS NO MORE

TO USE THE BEST

REPLACE WITH
"Indian Brand"

Shovel Dippers
Dipper Teeth
Shovel Treads

Crusher Jaw Plates
Mantles—Concaves
Bowl Liners
Roll Shells

Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA.

ESTABLISHED 1881

How to Make Five Simple and Understandable Lubricant Tests

The following are five simple and understandable tests for determining comparative values of lubricating oils for journals that require staying power, film strength, and efficient transmission. Any lubricant user can easily make them. Tests No. 1 and 2 demonstrate staying quality. Test No. 3, shock resistance. Tests No. 4 and 5, lubricity. In performing these tests no "laboratory equipment" whatever is required.

Test No. 1—Dip your thumb and forefinger into the lubricant. Open and close the finger and thumb and note how the oil adheres. Its adhering property is an indication of whether or not it will run out of the bearings. Adherence is desirable in many bearings, as most readers doubtless know.

Test No. 2—Place equal-sized drops of two oils having the same viscosity on a plate glass. Tip the plate to a nearly vertical position. The oil showing the greater resistance to flowing down the plate is preferable.

Test No. 3—Place on a steel plate equal-sized drops of two or more oils having the same viscosity. Hit each drop with a hammer and note how the oil is flattened out and splatters. The oil that does not splatter is preferable because it is most likely to prevent metal-to-metal contact under severe shock loads.

Test No. 4—Place a small quantity of the oil in the palm of your hand and rub vigorously. A thing clear film should adhere to all surfaces touched and should not be rubbed away. There also should be an absence of frictional heat.

Test No. 5—Place the lubricant in an open-mouth jar. Dip a wide piece of metal or cardboard into the oil and then lift it above the jar to a height of from 12 to 18 inches and note the film. The broader the jar and piece of metal, the broader will be the film. Ordinary mineral oil subjected to this test will flow from the plate rapidly and splash and splatter. A first class lubricant will flow off in the form of an even film and will not splash or splatter.

Protection from Lightning Recommended in New Report

Needless losses of life and property at surface and underground mining plants are reported from time to time because of the failure to exercise precautions during electrical storms and the lack of adequate protection against lightning, according to a U. S. Bureau of Mines publication released by Director James Boyd. *Protection Against Lightning at Surface and Underground Mining Plants* is the title of the circular.

Six cardinal preventive measures are suggested to avoid premature explosions and damage to equipment and buildings due to lightning. These include strict adherence to codes and regulations established for safe blasting procedure and the prevention of accidents; careful supervision of blasting methods and frequent dissemination of available knowledge on the subject; installation and maintenance of lightning arresters and electrostatic capacitors at strategic locations on power systems, and overhead ground wires on transmission lines; frequent checking of insulation on rotating machinery and transformers; provision and maintenance of low-resistance grounding connections for lightning arresters and for the frames of rotating equipment and transformers; and installation and maintenance of lightning rods and overhead ground wires on isolated buildings of nonmetallic construction.

A free copy of the report may be obtained by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13, Pa.

Fred P. Biggs has been appointed first vice-president of Brake Shoe & Castings Division of the American Brake Shoe Company. In addition to his new duties, he will continue as vice-president in charge of sales of the Brake Shoe & Castings and Southern Wheel Divisions, positions which he has held since 1944.

OVER 1000 Installations in cement plants!

In the past 20 years over 1000 PYRASTEEL Kiln Ends have been installed. Some have lasted for 14 years without a failure—6 to 8 years' service is quite common.

PYRASTEEL SEGMENTAL KILN ENDS

About 165 million barrels of cement—over 76% of the annual output — is produced in plants using either or both of our alloys, PYRASTEEL and EVANSTEEL.

PYRASTEEL is equally effective and economical in other high-heat applications, such as conveyor screws, feed pipes, clinker coolers, drag chains, and cement cooling equipment.

You can't beat this performance of PYRASTEEL Kiln Ends for avoiding burnouts and shutdowns, and insuring continuous production with low cost maintenance.

Unit Segments are easy to install or replace.

Write for PYRASTEEL Bulletin.

CHICAGO STEEL FOUNDRY COMPANY
PYRASTEEL for high temperatures
KEDZIE AVE & 37TH ST
CHICAGO 32, ILL.
Makers of Alloy Steel for 35 Years
EVANSTEEL for strength

$1,000,000 Lehigh Expansion At Metaline Falls Plant To Double Present Output

Productive capacity of the Lehigh Portland Cement Co. plant at Metaline Falls, Wash., will be doubled at a cost in excess of $1,000,000, according to a recent announcement by Paul G. Hahn, district manager. The Metaline plant's present rated capacity is 2,000 barrels of cement a day. This will be expanded to 4,000 barrels, placing the plant among the largest in the Pacific Northwest.

In explaining the expansion project, engineers pointed out that the largest single piece of new equipment is a kiln, which will produce as much as the two kilns now in operation at Metaline. Grinding facilities will have to be doubled as will quarry operations and storage capacity. Coal facilities will be increased from two carloads of coal daily to four, and increased storage for coal will be required.

Lehigh started its Metaline plant in 1911, and is currently producing five types of cement. Plant manager is A. W. Schaeffer of Metaline, who has been in charge of the plant since last spring. Lehigh's home office is in Allentown, Pa.

Pacific Coast Aggregates, Inc. To Open New Plant in August

Construction is well in progress on the new Eliot aggregates plant of Pacific Coast Aggregates, Inc., San Francisco. All concrete structures have been poured, much of the steel is in position and screens, crushers and other equipment are being installed. The new plant, one of the largest on the Pacific Coast, is expected to be in initial operation some time in August of this year. It will have an ultimate capacity of about 1,000 t.p.h.

The company recently opened a small plant at Centerville, Calif., moving its Diamond portable plant to the new location from Niles, Calif.

A sand-grinding plant is being added to the P.C.A. Kerlinger plant, near Tracy, Calif., for the reduction of pea gravel to sand. Equipment includes a rod mill, Wemco classified, bins, conveyors and a stacker belt.

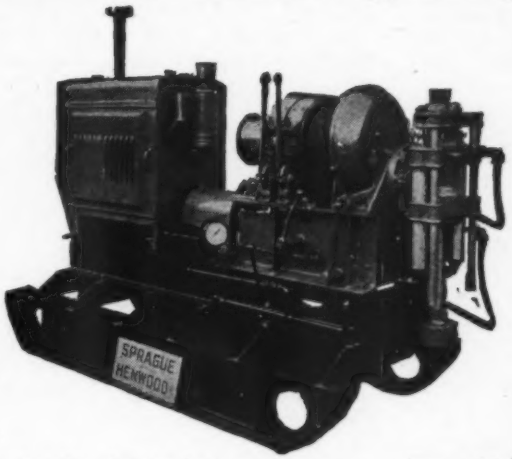
Fire Causes $75,000 Damage At Washington Brick-Lime Plant

Fire of undetermined origin razed a large warehouse and the adjoining sales office of the Washington Brick and Lime plant near Dishman, Wash., on May 7. The damage was estimated at $75,000.

Firemen managed to confine the blaze to the main warehouse, but the fire was fed by quantities of tarred roofing paper stored there. The plant's own pumps were inoperative because power lines went down in the blaze.

President Neal Fosseen stated that work on the new warehouse being built across the railroad tracks from the destroyed structure would be rushed, so that there would be no interruption in operations. The old building will not be replaced.

Sprague & Henwood
CORE DRILLING MACHINES
For EXTRA Efficiency



"Used under the toughest conditions . . . always able to handle any core drilling job easily"—that's how operators all over the country describe S&H Machines.

These high-speed, sturdy units back up the drill bit with ample, sustained, economical power.

Available in two types of feed, as desired. "Screwfeed" and "Hydraulic." Hydraulic swivel head can be furnished for either water or oil operation. Write for Details.

ALSO DRILLING CONTRACTORS

SPRAGUE & HENWOOD, INC.
Dept. K Scranton, Pa.

Drill Down Fast with **S & H** Bortz DIAMOND BITS

For Maximum Reduction, Economy, Production, and Safety
GRUENDLER ROLL CRUSHERS

GRUENDLER IS DELIVERING

Five Models—Nos. 18, 24, 30, 40, and 60 in a variety of stationary and portable designs.

WRITE FOR CATALOG NO. 700

Built to the highest standards of quality and precision, includes enclosed all-gear drive—solid manganese shells—X-braced frame, roller bearings throughout—designed to take many times as much load as it will ever receive in service. You may choose smooth, corrugated, step tooth or a combination of any of these rolls in the proper diameters to produce the desired stage of reduction in combination with jaw or other primary crushers.

1885 1948
OUR 63rd YEAR
GRUENDLER ST. LOUIS, U.S.A.

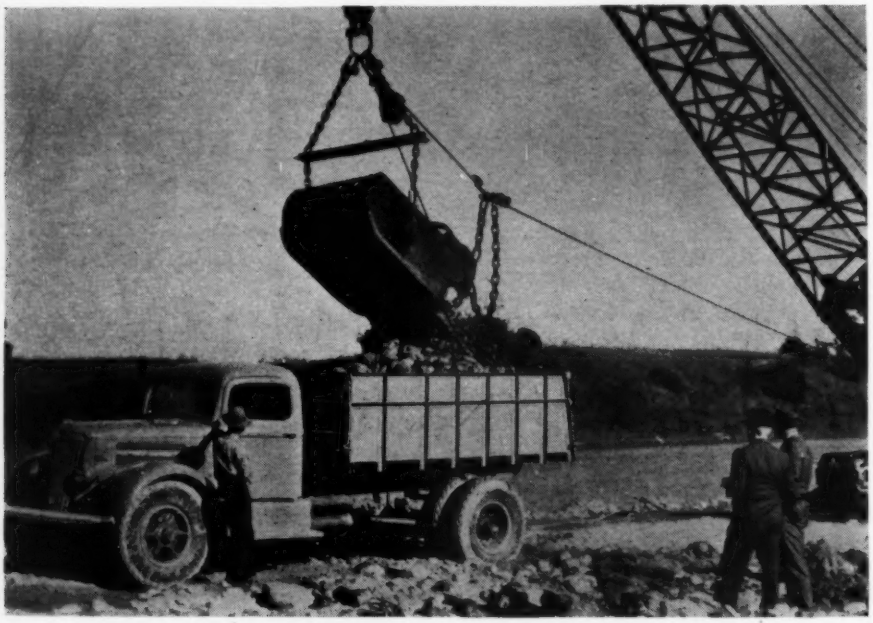
FOR PROMPT SHIPMENT
2X Hammermills up to 15 tons per hr.
3X Hammermills up to 30 tons per hr.
4X Hammermills 50 to 150 tons per hr.
6X Heavy Duty Hammermills 200 to 500 tons per hr.
10x16-24x36 Jaw Crushers.
40x24 Double Roll Crusher—Smooth or Step Tooth.

FEEDERS — CONVEYORS — BUCKET ELEVATORS
MFRS. of JAW CRUSHERS and HAMMER MILLS
Complete Portable and Stationary Plants

GRUENDLER
CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI

American Dump Trucks Perform Big Hauling Job in Australia

The strong preference which foreign countries show for American products is highly evident in Australia where, as an example, American-built trucks are employed on and off the highways in a multiplicity of operations. The records set up by many of these vehicles are nothing short of outstanding. High efficiency has resulted from the modern applications.



• American truck at Nepean Sand & Gravel plant, Sidney, Australia.

One of the interesting applications of American motor trucks is found at Sydney, Australia, where a fleet of White Super Power dump trucks are serving the Nepean Sand & Gravel Co., Ltd., day in and day out in a tough assignment—the handling of stone, sand, and gravel. Terrific impacts from heavy loads dropped aboard by power shovels, as well as the movement of the heavy loads over rough terrain, have failed to keep these vehicles from rendering efficient service year after year. The use of motor trucks represents the latest step in the company's material handling methods.

It was back in 1925 that the Nepean Sand and Gravel Co. installed its first $300,000 plant on the banks of the Nepean River, not far from the Richmond, New South Wales, to treat river sand, gravel and stone for sale commercially as building and roadmaking material. In those days the raw material, dredged up out of the river bed by dragline excavators, was transported to the processing plant with tramways and on from there with two-ton buckets on an aerial ropeway system. This was supplemented by a railway and steam locomotives, but the fact that the tracks at the river's edge had to be constantly shifted provided a perpetual problem. A more versatile means of transportation was needed.

In 1942 the company decided to use motor transport for haulage from the excavators to the plant, and six Model WA-18 White Super Power dump trucks of 6½- and 7-ton capacity were purchased for the job. These units immediately demonstrated their efficiency in the hard grueling service. The average haul from river to plant was one mile, or two miles on a round trip basis, and the vehicles readily made 35 trips per day each.

From the start, the company insisted on a policy of not overloading its trucks, although the units were quite capable of handling upwards of 8-ton payloads. As a result of quality selection of vehicles and reasonable care in operation and maintenance, the vehicles continue in highly efficient condition despite the severity of the work, involving short hauls at high speed over gravel roads. J. T. McKern, manager director of the firm, says that service over the years has been excellent.

More recently the Nepean Sand & Gravel Co. added a larger Model WA-26 White Super Power truck to its standardized White fleet. This heavy-duty unit, with double reduction rear axle and tires 11 in. by 25 in. in size, handles a 13-ton payload. In a minimum of 30 trips a day, covering 60 miles, the vehicle delivers some 400 tons of material at the plant. This experiment with the higher-capacity vehicle was decidedly satisfactory, setting a new pace in the hauling movements and marking a new trend. The increased hauling potential and the steady truck runs make it possible to keep the excavators going continuously, thereby effecting a new savings. A. McKern, works manager at Richmond, foresees even greater advantages of motor truck operations in the future.

In some 22 years of operation, over 4,000,000 tons of stone and sand have been dredged, transported to the plant, crushed, washed, screened, and dispatched to the company's bins in Sydney and elsewhere; and there is still an almost inexhaustable supply of raw material. In the 22 years, nearly $400,000 has been expended in improving the plant, which is one of the largest and most modern in the Commonwealth, having a potential output of 200,000 tons per annum of sand and stone. Tremendous postwar programs of building and road construction have brought extensive demands.

The Nepean Sand & Gravel Company's city selling agent, the Blue Metal & Gravel Pty., Ltd., also operates a fleet of three 9-ton-capacity White diesel WA-20 trucks for metropolitan delivery. They were adopted in 1942, about the same time that Nepean Sand & Gravel Company introduced motor transport at its Richmond plant.

Net sales of the Ohio River Sand Co. in 1947 amounted to $687,528 with net income after all charges of $90,767.

Dividend accumulations of the first and second preferred stocks amounted to $50 per share. Assets of the company were listed at $320,702, and current liabilities amounted to $112,785.

At the stockholders' meeting Thomas Graham, president of the Bankers Bond Co., was elected to the board of directors.

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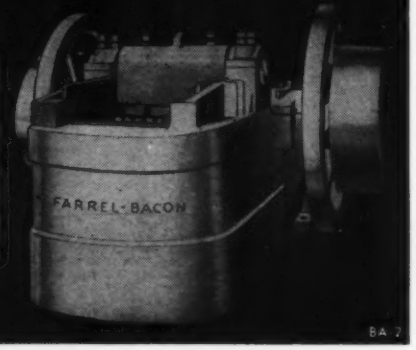
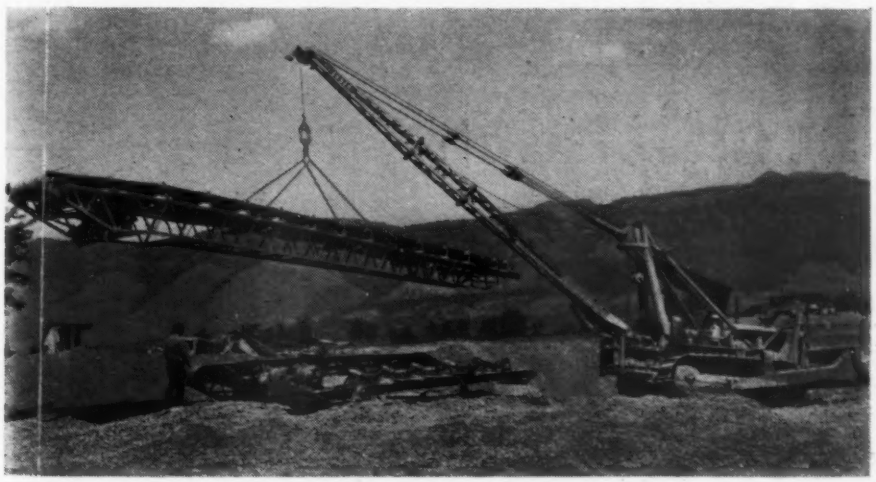


FARREL-BACON
ANSONIA, CONNECTICUT
BA 2

• The stacker end of the new 36-in. by 2,300-ft. conveyor, first unit of a $500,000 improvement program at the Irwindale plant of Consolidated Rock Products Co., Los Angeles. The new conveyor is equipped with a special 6-ply Goodrich belt and will carry pit run from a new pit section, passing through four tunnels enroute. After the broad program is completed the Irwindale plant's capacity will be about 1,000 tons per hr., as compared with the present 600 tons.

• Stockpiled crushed stone is loaded into trucks with a Hough Model HL "Payloader" at the A. Overgaard Rock Products Co., Elroy, Wis. It is then hauled to local, town and country roads for surface course. This "Payloader" handles 30 to 40 cubic yards per hour.



• A "Caterpillar" diesel D7 tractor, equipped with a Hyster "Hystaway," sets up the E. C. Hall Company's portable crushing plant near Union, Ore. Three "Cat" diesel electric sets furnish the juice for the power plant.

New Mexico Potash Mining Methods Described in Report

A survey of the operating procedures of the Potash Company of America in the Carlsbad region of New Mexico—one of the nation's chief sources of commercial-grade potash—is presented in a report made public today by the U. S. Bureau of Mines.

Although Potash was first found in the Carlsbad area in 1925, commercial exploitation of the region did not begin until 1931, the publication points out. Two years later, in 1933, the Potash Company of America started shaft-sinking operations and was in production by the following year.

Because potash deposits in the Carlsbad area resemble flat coal beds, coal-mining equipment and methods have been used successfully, according to the report, which also deals with the geology of the area, methods of sampling and estimation of tonnage and values, transportation and ventilation.

Other topics discussed in the report are safety measures, current wage scales, and company organization. Several photographs of the surface plant and underground workings, as well as charts illustrating mining methods reviewed in the text are included in the publication.

A free copy of Information Circular 7445, *Mining Methods and Practices at Potash Company of America, Eddy County, N. Mex.*, by Walter R. Storms, Bureau mining engineer, may be obtained by writing to the Publications Section of the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.

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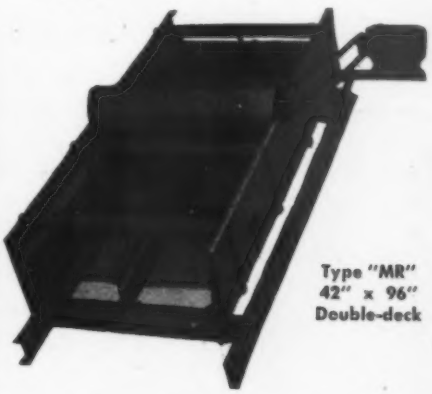

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$25,000 Mineral Wool Plant Begins Production at Omaha

The K.B.S. Mineral Wool Co., has started operations in a recently completed plant at 3rd and Pierce streets, Omaha, Neb., and is expected to have an annual payroll of $150,000, according to Frank B. Kennard, vice-president and treasurer. Other officers of the new firm are Clayton K. Bowe, president, and William H. Scott, vice-president and general manager. Mr. Kennard will also be sales manager.

The new plant, which was completed at a cost of $25,000, will produce mineral wool blankets and battings, granulated and pouring wool for use by applicators, and loose material for insulation and building construction. It is the only plant of its kind in the Omaha area, the closest competing mineral wool firm being located at Minneapolis, Minn.

Manufacture of granulated wool started early in April, with a daily production of 36 tons, Mr. Kennard said. Production of batts and blankets is scheduled to start late in May or in June.

Nebraska's and Omaha's low tax rate and the excellent transportation facilities in and out of Omaha were factors in picking Omaha for the plant site, according to President Bowe.

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LSTs Carry Heavy Freight Instead of Fighting Men

Business is booming for the Halliburton Oil Well Cementing Company to the point that the firm has recently converted three Navy LSTs into cement barges which ply the waters of Louisiana bayous in the oil areas. Halliburton supplies an indispensable service to oil men, that of cementing their wells. With new wells being constantly drilled in this region, the deliveries of cement had to be streamlined.

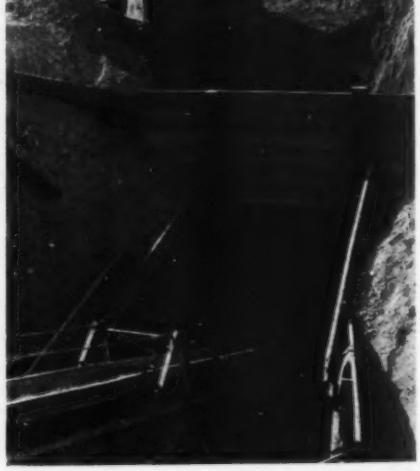
The ex-LSTs are powered by 165-hp. Gray diesels and equipped with 4-cylinder General Motors diesels for performing the cementing operations. Water is obtained from the bayous and mixed in cement mixers aboard. The cement pumps are capable of delivering 10 barrels of fluid cement per minute.

Each of the barges carries 2,000 sacks of bulk cement in eight V-shaped storage bins. The operations of the vessels are controlled by ship-to-shore marine telephones from the chief operating base at Harvey, La.

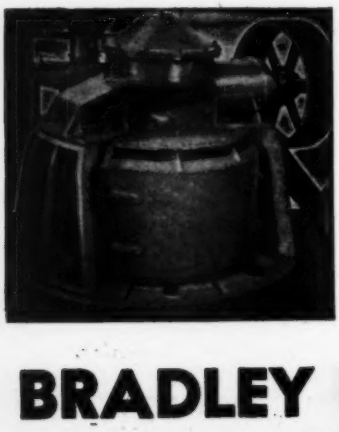
1946 Canadian Salt Production Shows Volume-Value Decrease

Statistics released by the Canadian Department of Trade and Commerce on salt production in the Dominion during 1946 indicate that total output reached 537,985 short tons, valued at $3,626,165, as compared with 673,076 short tons, valued at $4,054,720 in 1945. The decrease in tonnage was 20 percent.

Four provinces—Nova Scotia, Ontario, Manitoba and Alberta accounted for the total output, of which Ontario produced 82 percent. Nine plants were in operation during 1946, and personnel numbered 713.



• Feeding the conveyor at a gravel plant near Monterey, Calif., is the job for this cable-controlled Bucyrus-Erie bulldozer, mounted on an International TD-18 crawler tractor and owned by McCaslin Material Company, Los Angeles.



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NEWS OF CONCRETE MANUFACTURERS

15 Flexicore Manufacturers Meet at Dayton, Ohio To Form Organization

During the two-day meeting of Flexicore manufacturers and distributors held on May 27 and 28 at Dayton, O., an association was formed and officers and directors were elected. The organization, as yet nameless, will be headed by the following officers: Frederick W. Reinhold, president; Charles V. Harker, vice-president; Eugene M. Stephens, secretary-treasurer.

The board of directors is composed of F. W. Reinhold, Anchor Concrete Products, Incorporated; Stephen Stepanian, Arrowcrete Corporation; Eugene M. Swenson, Calumet Flexicore Corporation; C. V. Harker, Mid-States Concrete Products Company; E. M. Stephens, The Flexicore Co., Inc. The directors were scheduled to meet in June.

It was announced at the Dayton meeting that more than 8,000,000 square feet of Flexicore precast concrete floor and roof slabs with prestressed steel reinforcement have been manufactured, delivered and erected by the 15 Flexicore companies forming the association.

Peckworth Urges Pipe Makers To Fill Out Questionnaires

In a message addressed to members of the American Concrete Pipe Association, Harold F. Peckworth, managing director, appealed to them to give full co-operation in filling out a questionnaire being sent to pipe manufacturers by Herbert K. Cook of the Corps of Engineers.

Mr. Peckworth explained that the Corps is trying to assemble information on concrete pipe in carrying out its research project, which will be conducted by the Concrete Research Division of the Waterways Experiment Station at Clinton, Miss. Due to the extensive employment of concrete pipe in recent years, especially in the construction of airfields, top-rank Army personnel are seeking more information on the physical characteristics of this product.

N.C.M.A. to Push House Plans In Triple-Pronged Campaign

A threefold plan is being carried out by the National Concrete Masonry Association in its current effort to promote the popularity of concrete masonry homes.

1. The 1948 edition of its portfolio "Homes of Distinction" has been completely revised. The most popular plans in the previous edition have been retained and new plans have been added.

2. Newspaper advertising mats of 16 plans (from the portfolio) will be available to members. Appropriate copy for each is also available.

3. Scale models of homes will be available for display. No charge will be made for the loan of these models, except payment of express costs.

Members are urged to participate in this house plan service, in order to give the concrete masonry home movement the desired impetus.

A.C.I. Quarter-Century Members Cited in Assn. Journal List

Listed among 139 members of the American Concrete Institute affiliated with the group for 25 years or more are the following:

Allentown Portland Cement Co., 38 years; Alpha Portland Cement Co., 43 years; American Concrete Pipe Association, 26 years; Buffalo Slag Co., 26 years; Canada Cement Co., Ltd., 32 years; Cemento de Mixcoac, S. A., 26 years; Austin Crabbs, 27 years; Duquesne Slag Products Co., 31 years; Alexander Foster Jr., 36 years; Giant Portland Cement Co., 34 years; Glens Falls Portland Cement Co., 40 years; C. E. Ireland, 34 years; Kosmos Portland Cement Co., 22 years; Lawrence Portland Cement Co., 32 years; Lehigh Portland Cement Co., 43 years; Lone Star Cement Corp., 25 years; Medusa Portland Cement Co., 32 years; Nazareth Cement Co., 32 years; North Jersey Quarry Co., 27 years; Northwestern States Portland Cement Co., 40 years; Polaris Concrete Products Co., 25 years; Universal Atlas Cement Co., 34 years; Stanton Walker, 27 years; Whitehall Cement Manufacturing Co., 40 years; Wilson's (NZ) Portland Cement Co., 38 years.

Coming Events

July 16-24, 1948—Chicago. Convention and Road Show, American Road Builders Association, Soldiers Field.

September 20, 1948 — Colorado Springs. Directors' meeting, National Ready Mixed Concrete Association, The Broadmoor.

Soldier Field.

January 31-February 3, 1949—Cleveland — Annual convention and exposition, National Concrete Masonry Association, Cleveland Auditorium.

February 1-4, 1949—New York. Annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

Contracts Worth $80,000 Awarded Concrete Tile Plant at Holdredge, Neb.

The Platte Valley Cement Tile Manufacturing Co., owned by George Lillie of Scottsbluff, Neb., began operations early in June at Holdredge, Neb. The first contract for the new plant includes pipe to carry water from the main Republican River Valley canal at Oxford, Neb.

Mr. Lillie said he has contracts for $80,000 worth of concrete tile and expects additional contracts on a project linking Trenton to Superior, Neb. The site upon which the plant has been erected has been leased for three years, with an option to rent afterwards on a year-to-year basis. Approximately 35 men will be employed at the new plant.

New Equipment to Replace Machinery Lost in Plant Fire

Facilities of the Thurston Block Plant, Inc., at Casper, Wyo., was destroyed by fire recently, including all equipment. New machinery is scheduled to arrive in the immediate future, according to the management.

The plant was reopened about a week after the fire, operating with factory rebuilt machinery. Completely new automatic block manufacturing equipment is to be installed about June 1, with live steam curing rooms.

Mooney New Representative For Universal Concrete Pipe

William Mooney II of Spartanburg, S.C., has joined the Universal Concrete Pipe Company in Atlanta, Ga., as a sales representative for the Southeastern area.

Mr. Mooney, who studied civil engineering at George Washington University, formerly was employed by the Raymond Concrete Pile Company, New York City.

Seybold Bros. Block Facilities Destroyed in $50,000 Fire

Damage estimated at $50,000 resulted from a fire at the Seybold Brothers Sand & Gravel Company's concrete block warehouse at Dunkirk, N. J., on April 13. A frame office building was also destroyed.

Exploding lubricants stored in the warehouse fed the blaze, which was of undetermined origin. The business is owned by Francis X. and Leo G. Seybold.

Dick Kimball, prominent young Lincoln, Neb., business man, has joined the Lincoln Hollostone Co. as vice-president, according to an announcement made by Evar P. Peterson, company manager.

Gene Olson Corp. Will Produce New Equipment Line at Adrian

Eugene F. Olsen, who resigned recently as president of the Stearns Manufacturing Co., has just announced the formation of The Gene Olsen Corp. through which he plans to continue his long association with the concrete products equipment field. Associated with

Robert O. Davis, vice president in charge of engineering.

Mr. Olsen in this new undertaking are his son, Gene D. Olsen, vice president and secretary of the company, who will be in charge of sales, and Robert O. Davis, vice president and treasurer, who

Eugene F. Olsen, president of the new company.

will have complete charge of engineering and production.

The company now occupies 50,000 sq. ft. of factory space in Adrian, Mich., where its home offices are located, and an additional 80,000 sq. ft. is available for future expansion. Under the trade name "Gocorp," the company plans to manufacture a complete line of concrete mixers, block machines and other accessories. Pending actual production of new equipment lines, it offers for prompt shipment attachments and service parts on all Stearns machine.

Mr. Olsen has been closely associated with the concrete products machinery field since 1919. He has been successively president of the Anchor Concrete Machinery Co., the Consolidated Concrete Machinery Corp., and the Stearns Manufacturing Co. His connection with the latter concern spanned the period from 1933 until the present year, when he disposed of most of his holdings in the company.

Prior to joining the new enterprise,

Gene D. Olsen, vice president in charge of sales.

Gene D. Olsen was assistant manager of the Stearns-Oakes Sales Co. of Adrian, Mich., distributors of Stearns equipment in several states. Mr. Davis was formerly vice-president in charge of production for Stearns.

So Light a Child Can Lift It— A Newspaper Photo Proves It

To prove the claims made by Ray I. Thomas that he is producing a feather-light pumice block at his Corpus Christi plant, this enterprising business man called on his four-year-old son, Charley.

He had the lad pose for a newspaper picture (see cut) holding a large pumice block with apparent ease. Beneath the picture was a legend explaining that Charley had no difficulty in lifting the unit, but could not budge the concrete block (of the same dimensions) nearby.

Mr. Thomas is manager of the Thomas Concrete Pipe Company, which was established in 1940 for the manufacture of plain and re-enforced concrete pipe and masonry units. The pumice block line was added recently.

The Konkrete Bloc Company, owned by Gene Siegfried at St. Francis, Kan., has installed equipment to manufacture pumice block composed partly of silica or volcanic ash. Mr. Siegfried said the ash appears to be plentiful in Cheyenne County, where his plant is located. He is considering the possibility of shaft-mining the silica.

Frank Stein, president of the Schenectady Cast Stone Company of Schenectady, N. Y., died on April 25 in that city. He was 65 years of age.

Paul Moser, executive of the Reimers-Kaufman Concrete Products Company, Lincoln, Neb., has been named to the industrial committee of the Lincoln chamber of commerce, which has been expanded to promote the welfare of Lincoln's rapidly growing manufacturing industries.

At Hillsboro, Mo., a fire destroyed the block plant of the Hillsboro Concrete Block Company on the night of April 1. The owners, Albert Patrick and Alvin Pigue, estimated the damage at about $2,500.

Floyd Hubbell of Ypsilanti, Mich., recently began production of concrete brick at his new $20,000 plant in that city. The owner anticipates an output of 14,000 units per day.

Jesse L. Slaton, owner of Slaton & Sons, manufacturers of concrete blocks in Kansas City, Mo., died recently in a hospital of that city. He was 66 years of age. Mr. Slaton had operated the block business for the last 15 years.

Booming Business Started From Experiments with Lightweight Concrete

Ten years ago Allen Schaaf Sr. began experimenting with lightweight concrete in a small shop in Flint, Mich. Today, associated with his two sons, Allen Jr. and Cecil, he has formed Modern Crete, Inc., which has enfranchised 18 plants in Michigan and many concerns in other states. Recently the Rocky Mountain Empire Crete Corporation in Denver was given exclusive manufacturing and sales rights in ten Western states.

Modern Crete is said to be four times as strong as ordinary concrete, although only half as heavy. It is precast in three basic forms—slabs 8 feet long and 16 inches wide; headers for door and window openings; and corner pillars.

Mr. Schaaf and his sons used their family home for a testing laboratory. They applied Modern Crete to test its qualities in flooring, ceilings and panels, until the house is hardly recognizable as the old homestead. The Schaafs consider their product a substitute for lumber, having all the desirable characteristics of modern lightweight concrete units. Cecil is president, his father is vice-president, and Allen Jr. is secretary-treasurer.

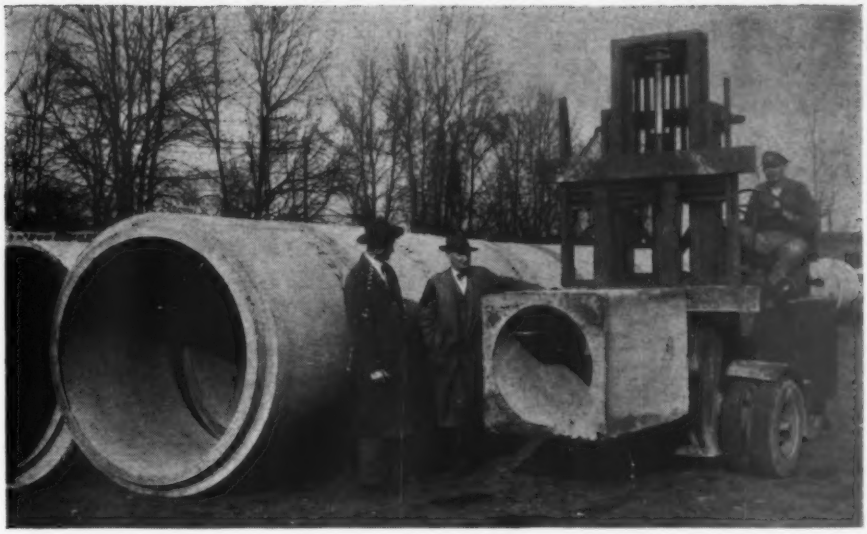
N.C.M.A. Presents Winning '47 Noble Award Suggestion

The National Concrete Masonry Association has presented to its members a description and a drawing of the $500 prize-winning suggestion in the 1947 Thomas W. Noble Award competition. The suggestion, submitted by H. Mills, foreman at the Concrete Products Corporation's plant at South Bend, Ind., was a description of a block height control process.

N.C.M.A. officers also called attention to the coming 1948 contest, details of which will be announced within a few weeks. Members are requested to urge employees to enter their best ideas and suggestions in the new competition.

Charles L. Springer, 74, at one time owner of the Springer Concrete Co., Buffalo, N. Y., died on May 24 at his home. He had been ill nine years. He organized the concrete company in 1921 and turned over control of the business to his son-in-law, Wilbert C. Ritchie, when he retired nine years ago.

The facilities of the Acme Industries, erected in South Bentonville, Ark., by Loy Seamster at a cost of $45,000, is scheduled to begin production soon. Products will include drainage tile, septic tanks, concrete blocks and concrete staves for silos.



• You may not be able to get a square peg in a round hole but you can make round concrete pipe with a square mold. At least, the Rochester (N. Y.) plant of the Universal Concrete Pipe Company can do it. Nelson Krenzer, plant superintendent, worked it out for a customer who wanted a square exterior and the customary round interior, a somewhat unorthodox pipe. Shown above is a piece of the 36-inch pipe made under Mr. Krenzer's direction, being inspected by J. M. Millious, Universal's advertising manager from Columbus, O., and L. E. Barrett, Rochester sales representative. Mr. Krenzer is operating the lift.

• The successful development of a process for veneering precast concrete units with smooth-faced granite slabs has been announced by Robert Gibb & Sons of Aberdeen, Scotland. Although complete details are lacking, it is understood that the process lends itself equally well to complete prefabrication in plants or to application of veneer on the job site. The granite veneer, approximately ⅜ of an inch thick, is machine cut in a specialized plant, back surfaces being roughened to assure maximum bond with the concrete. No dowels or other mechanical aids are employed, since adherence is largely achieved by the use of a special mix. The faced units in the photograph above are without cores. They measure 6 by 9 by 18 inches. Under compression tests the veneer is said to retain its bond with the concrete, even after the units are fractured. The developing company, which operates the Excelsior Granite Works in Aberdeen, is understood to be interested in introducing the product in the United States.

• The picture on the right shows a section of a concrete crib wall constructed at the Consolidated Coal Company's Arkwright mine at Gandeeville, W. Va. Concrete cribbing, manufactured by the Universal Concrete Pipe Company at New Martinsville, W. Va., was used for the 600-ft. long wall, which ranges between 6 and 15 ft. in height and supports six railroad sidings. The wall was constructed on a 2-in. to 12-in. batter and backfilled with limestone and gravel.

• This view shows the plant of the Albany Concrete Products Company as it was up until February, 1944, when a policy was adopted of expanding the business into various lines related to concrete masonry.

Case History—Progressive Policies Expand Small Block Plant into Sizable Industry

another ON THE SPOT report

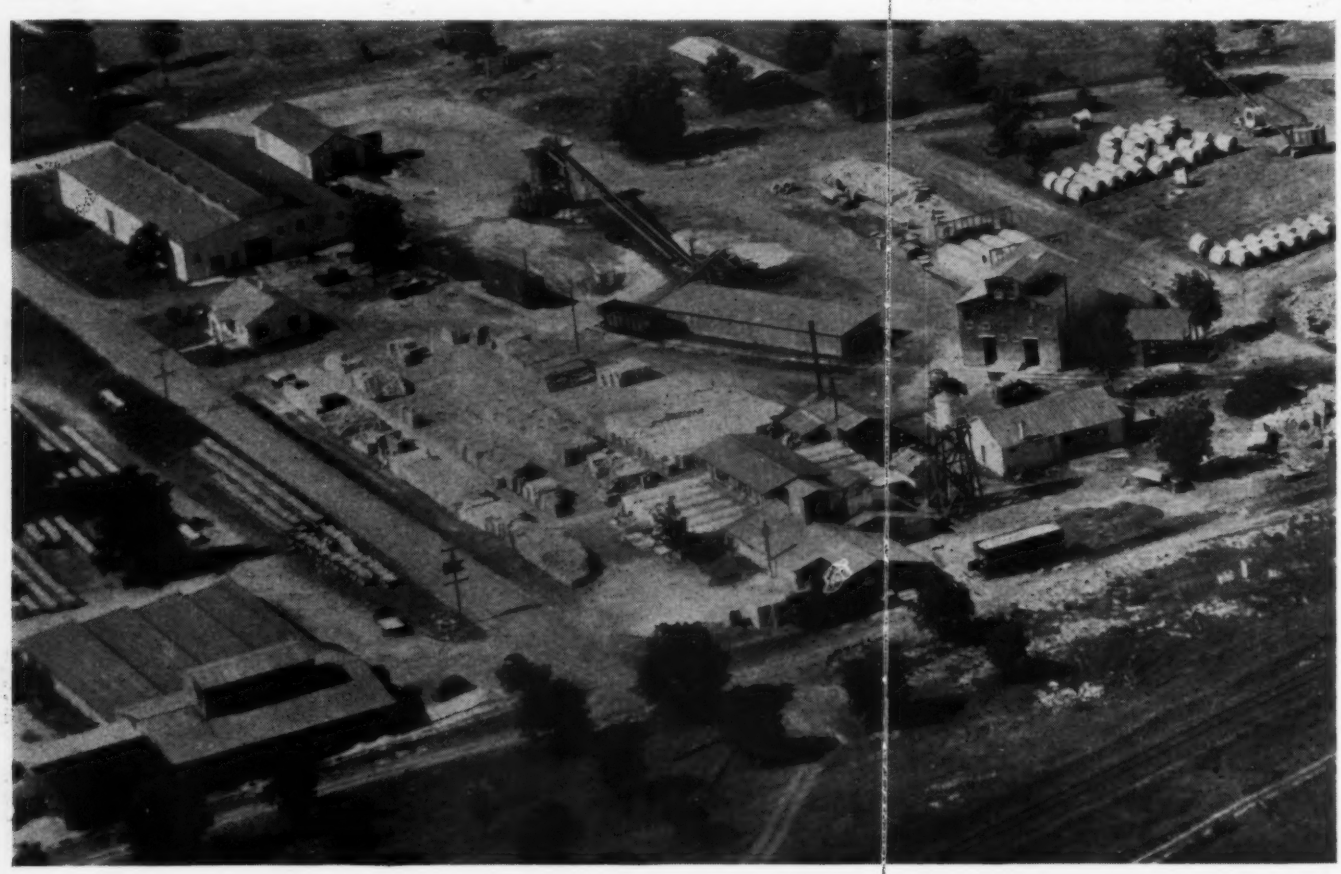
By WILLIAM M. AVERY

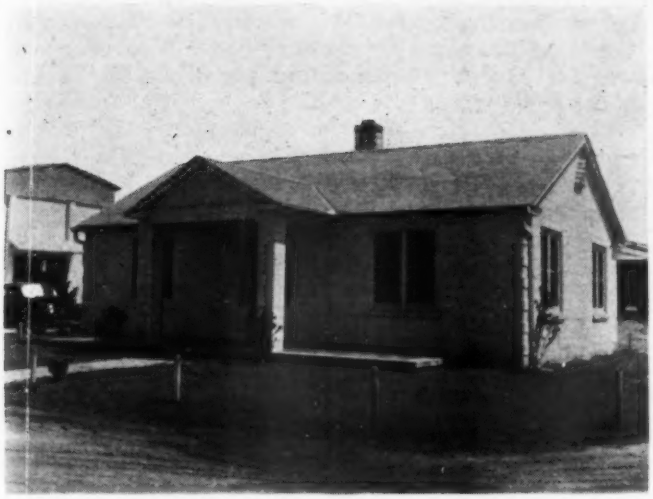
THE two photographs on this page record the remarkable growth of a small concrete products plant into a sizable and prosperous industry in a period of about four years. The concern is the Albany Concrete Products Co. of Albany, Ga., which was organized in 1941 to manufacture concrete masonry units only. Its growth, as shown in the large aerial photograph, dates from February, 1944, and represents not so much an expansion of the block business as a broad branching-out into numerous allied lines. Since a similar trend is in evidence among block producers in many sections of the country, we believe our readers will be interested in a brief case history.

The Albany area, prior to the advent of this company, had been a poor market for concrete masonry units. Several earlier concerns had failed miserably to create sufficient demand to stay in business, and the organizers of the new enterprise found the going pretty rough at first. There seemed to be no specific reason for the lack of acceptance; it was simply a fact to be reckoned with. Even during the first year of the war, when competitive materials became difficult to obtain, there was no general stampede to concrete block.

To break down this resistance, the new company early in 1943 organized its own crews of masons, and began selling block in place. This arrangement not only made it more convenient for local people to use the product, but gave the company close control over the quality

• An aerial view shows the plant as it is today. The block nucleus remains unchanged except for the construction of 12 modern curing kilns. The large building in the background is used to warehouse builders' supplies. The concrete pipe plant at the left is operated by another concern.





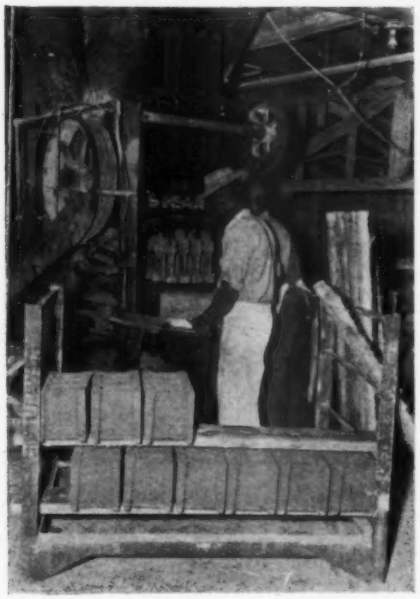
• The company's best promotional investment was the construction of this model concrete masonry office building on the plant property. Various treatments were worked out on the room interiors to show buyers the effects they can obtain with concrete blocks.

• Aggregates are loaded from the stockpile with this bucket loader for transfer to the ready-mixed concrete plant.

of the workmanship. In a little over two years of operations on this basis enough quality structures were erected in the area to establish that concrete masonry was *not* a substitute material, but a prime building product in its own right. By early 1945 local contractors began to use the company's blocks, and the practice of selling in place was discontinued in order to avoid competing with them.

Another smart promotional move which the company made during this thawing-out period was to build its own attractive concrete masonry model office building, incorporating in it a variety of treatments to demonstrate the possibilities of the product. This proved eventually to have an advertising value considerably in

• Steel forms for making flag stones are laid out in the open. Mixer trucks returning with unused concrete dump into the forms.



• The block plant turns out 6000 units in 10 hours (including startup and cleanup time) with two tamp machines of the type shown here.

• Cured units being removed from one of the 12 kilns with a gasoline-powered lift-truck.

excess of its cost. Casual passersby noticed the structure and made mental notes that perhaps there was something after all to this matter of building with concrete blocks. Lukewarm prospects were turned into enthusiastic buyers when they saw the end product of the material attractively displayed in three-dimensional form.

In this fashion the block market was built up until it exceeded the capacity of the single Stearns Clipper Stripper with which the plant had been equipped originally. A second machine of the same make and type was installed earily in 1944, and additional curing and handling facilities were developed to take care of the increased production. A program of radio and newspaper advertisements was also launched about this time, and proved to be so successful that the company's annual budget now includes a generous allowance for this purpose. Sixteen spot ad broadcasts have been worked up for radio use, and these go out three times daily, seven days a week, over a local radio station.

Advertising space is also contracted for in a local daily newspaper, the Albany *Herald,* and frequent changes are made in copy to highlight the particular product which the company is interested in pushing at any given time. Similar advertisements, aimed at both the urban and rural markets, are run in newspapers in the surrounding counties. This practice has broadened the company's market until it now embraces an area comprising 29 counties.

To serve this large market area, a unique arrangement has been worked out whereby contract haulers handle all deliveries on a unit basis. The haulers are paid ½ cent for each 8- by 8- by 16-in. equivalent loaded at the plant, plus an additional 1 cent for hauling and unloading anywhere within a 5-mile radius. For deliveries outside the 5-mile zone, and additional 1-cent payment is made for each 30 miles of hauling.

Although moderately satisfied with its accomplishments in the block field, the company's top management felt that the business would be on a sounder footing if other materials were produced in addition to concrete masonry units. As the first step in this direction, in 1945 a small batching plant was set up for ready-mixed-concrete operations. It consisted of a 100-ton, two-compartment Butler bin supplied from an undertrack hopper by an inclined belt conveyor. Sacked cement is fed to the trucks from a dumping ramp in a nearby cement storage building.

Three 3-cu. yd. Jaeger transit-mix trucks are currently in operation, supplying 1,200 to 1,500 cu. yds. per month to an area within a 20-miles radius. A surprisingly large share of this output has been going to the farm market.

As a direct offshoot of its ready-mixed-concrete operations, the company edged into the manufacture of precast concrete stepping stones. It was found that the transit-mix trucks frequently returned to the plant with small quantities of concrete which the customer couldn't use even though he had paid for it. This waste material threatened to become a serious nuisance until someone proposed that it be used for making stepping stones. Simple steel forms were laid out in the plant yard for molding units measuring 12 by 12, 12 by 18, and 12 by 24 inches, all 2 inches thick. This product was featured periodically in the company's advertisements, and the demand very soon exceeded the 75 sq. ft. per day that could be turned out with waste concrete. Special mixes are now used to supplement the concrete returned by the transit-mix trucks, and production runs about 150 sq. ft. per day. At a selling price of 20 cents per square foot, stepping stones have proved to be a worth-while adjunct of the business.

• Left: One of the 3-cu. yd. mixers receiving aggregates from the two-compartment, 100-ton bin.

As a further expansion of its activties, and to provide block users with the kind of service that would bring them back, Albany Concrete Products now handles a complete line of allied building supplies, embracing primarily items not ordinarily carried by building supply dealers. Using its own plant crew exclusively, and spreading the work over a period of almost two years, the company built an 80- by 160-ft. fireproof warehouse in which to carry on this phase of the business. Among the items carried in stock are junior steel trusses, reinforcing bars, glass block, door and window frames, paint, glass, putty and numerous other materials. Four-by-eight lintels, produced in gang forms on the floor of one of the block plant kilns, are also stocked.

Similar steps have been taken to encourage farmers to use the company's materials and service facilities. A special warehouse handles carload lots of hog fence and barbed wire, and also houses a small hot-dip plant for creosoting fence posts. In its farm advertisements the company points out the convenience of purchasing these materials, as well as blocks and ready-mixed concrete, from a warehouse which is only a few blocks away from the union stock yards.

Only one venture has failed conspicuously. A well equipped plant was installed about a year ago to manufacture concrete brick. For some reason the product failed to find a satisfactory market, and rather than throw good money after bad, the company stopped production. The building was converted into a millwork shop and is at present producing door and window frames and similar items at top capacity. By

(*Continued on page* 209)

Latest Control Methods And Equipment Used in Ohio Central Mix Plant

• Henry Beckley, president, and R. P. "Russ" Mumford, secretary and manager of the meterials division.

another ON THE SPOT report

THE Beckley & Myers Co., at Springfield, O., a growing industrial city of over 70,000 population, operates a new concrete central mixing plant which is of unusual interest not merely because it is new but because it incorporates methods and

By WALTER E. TRAUFFER

equipment which are revolutionizing the industry. The plant is the latest type C. S. Johnson Octobin central-mixing setup which can be used for central batching in an emergency. Space has been left for the possible future installation of a second mixer. Air-entraining agents are added to standard portland cement for accurate mix control and the most advanced methods and equipment are used to make and check the mixes produced. Dump-type bodies have been added to the company's fleet of standard dump-type agitators.

The company was formed in 1894 as a wholesale and retail business in coal and all hard building materials, including aggregates and cement. Familiarity with the latter products stood the management in good stead when 12 years ago the company entered the ready-mixed concrete field with a central-mixing plant and truck mixers. This plant is kept in stand-by condition but all production now comes from the new plant, which went into operation late in 1947.

Henry Beckley, the progressive president of the company, personally keeps in touch with all phases of its business but leaves the ready-mixed concrete end of it to R. P. "Russ" Mumford, secretary and manager of the materials division. Able assistance is provided by Robert Yoakum, plant superintendent, and Clarence Dillahunt, dispatcher.

Company officials have for some years been sold on air entrainment with proper plant control and have sold customers on it because of its placeability, workability, minimum bleeding, etc. Now nearly all the concrete produced is air entrained, except for a few floor jobs. A.S.T.M. Type I—(standard portland) cement is used exclusively and air-entraining admixtures are introduced in the plant. The company designs its own mixes and decides whether Dewey & Almy Darex or Master Builders Pozzolith is to be used, the selection being based on the type of job, the hauling time, weather conditions, etc. It is interesting to note that industrial driveways and other concrete exposed to calcium chloride and severe weather conditions are standing up beautifully.

A card system of mix design has been developed which accomplishes the same purpose as the Townsend disk, which attracted so much attention at the National Ready Mixed Concrete Assn. convention in January. A series of cards (see illustration) has been designed for the various mixes required on a strength basis, and constant checks are made through cylinders which are broken by a commercial laboratory. As the need arises new cards are made or the old ones altered because of changing conditions. The card for each mix has separate proportions for 10 different moisture contents. Chapman flask moisture readings are made at intervals to guide the operator in using the chart. (The designation SF on the chart is the sand factor.) Daily checks on air entrainment are made with an Acme meter.

The cement is received in bulk cars from which it is discharged to an under-track screw conveyor. A bucket elevator feeds it either to a 750-bbl. steel auxiliary storage silo (which feeds back to the same screw) or direct to the 450-bbl. center compartment of the C. S. Johnson Octobin. Unloading of the cars is facilitated by the use of air jets—a 400-bbl. bulk car is unloaded in less than two hours. A Kellogg-American compressor supplies the air.

The aggregates—sand and uncrushed gravel—are received either by rail or by truck and are dis-

No. 304 PLAIN 3000 PSI - 28 ds. BATCH WEIGHTS

Control Mix	1	1½	2	¼	½	¾	1¼	1¾
Water lbs.	290		580					
Cement lbs.	470		940					
Sand	1390		2780					
No. 4 Gravel	1980		3960					
No. 3 Gravel								
Add - Mix								
S. F.	41							
W - C	62							

• A typical mix design card which simplifies the batcher's job.

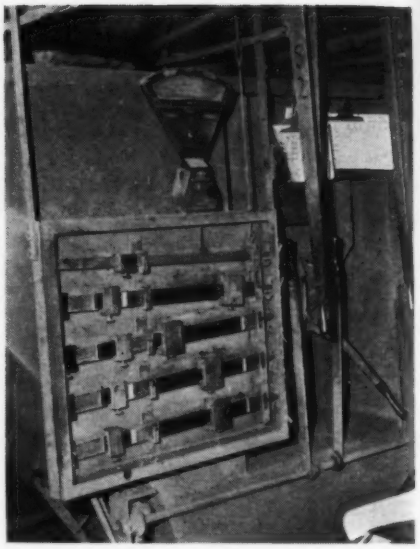
charged through separate track or truck hoppers onto an under-track tunnel belt conveyor. The aggregate bucket elevator discharges into the four 63-cu.-yd. aggregate compartments through a revolving spout controlled by cable from the ground. The electrical controls for these units are interlocked so that neither the screw nor the belt will start until its elevator is started; and each stops when its respective elevator stops.

The Johnson batchers are also of the latest type, the separate cement batcher nesting into the 3-cu.-yd. aggregate batcher. There are separate scales—one with four beams for the aggregates and a I-beam scale for cement. Aggregates are fed through manually-operated arc gates and the cement feed has an automatic cutoff.

Water from the city mains goes through a 500-gal. tank for steam heating in cold weather. A thermostatic control keeps the water in the tank at any desired temperature. The steam is provided by an upright boiler which also supplies steam for heating the aggregate bins through jets. The water goes from the tank to a Johnson water-weighing batcher.

The two admixtures used are introduced through the water batcher and are weighed as part of the mixing water. Darex and Pozzolith dispensers are used to weigh out the desired amounts of admixtures.

• The water weighing batcher with admixture dispensers at the left above and at right.



• The aggregate and cement weighing batchers with their scales and control levers for all operations.

The batched aggregates can be discharged either direct to truck mixers or into the Koehring 56S plant mixer. The water can be discharged similarly either into the plant mixer or into the truck mixer body or tank, as desired. A hopper and spout are used to discharge concrete from the plant mixers to the trucks.

The controls for all operations are within easy reach of the plant operator on the batching floor. An intercommunication system and telephones connect the main office, the dispatcher and the batcher. When a truck mixer comes into the yard the driver gets his ticket from the dispatcher and then drives to the plant, where the batch is nearly ready by the time his truck is spotted under the mixer.

The concrete delivery fleet now includes nine Jaeger 2- and 3-cu. yd. horizontal and high-dump agitators mounted on International and G.M.C. trucks. Three Maxon

(*Continued on page* 212)

• Left: The new central-mixing plant, with a part of the old plant visible in the background.
• Below: A dump-body truck waiting for a load of concrete under the plant mixer.

Excellent Promotional Job Pays Off For Michigan Block Concern

another ON THE SPOT report

OF the many factors which ultimately determine success or failure in the concrete products field, the producer's attitude toward merchandising and promotion easily heads the list. In our interviews with products men throughout the country we invariably ask: "What are you doing to promote the sale of your products?" The answers we receive indicate that a considerable majority of producers who have been in the business 10 years or longer are not only thoroughly sold on the importance of merchandising, but are definitely engaged in some form of purely promotional activity.

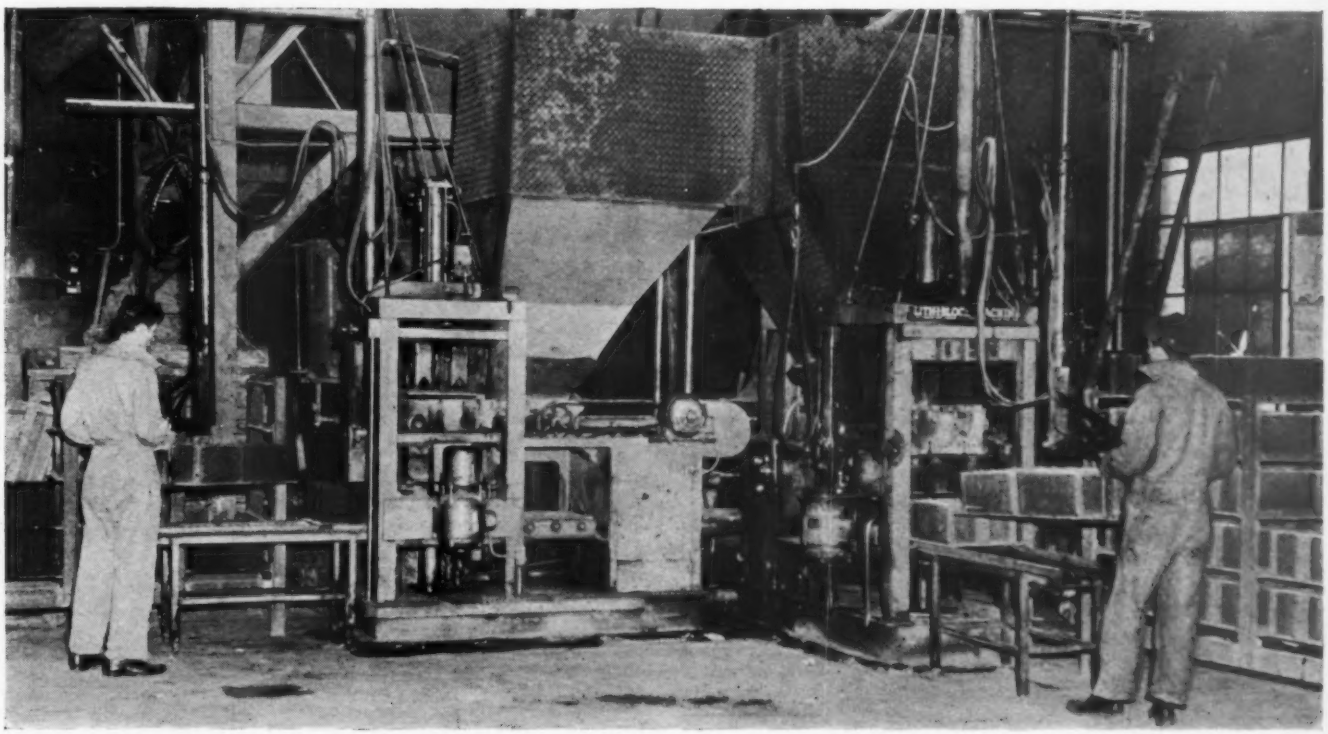
Too often among newcomers, however, a different attitude prevails. It can be summed up adequately in this rather typical remark, which we have heard countless times in one form or another: "Why should I advertise? I can't begin to take care of the business that comes in over the transom." The annals of American business are full of the names of dead and forgotten concerns which were operated in accordance with this wholly false assumption. To us the proposition seems particularly true in its application to the block industry. Although we believe the industry's present prosperity is quite soundly based on qualitative superiority to most competitive materials, there can be little doubt that a fair share of today's demand for concrete masonry units exists because of the continued shortage of other building materials. Products manufacturers, and most particularly the newcomers in the field, can in our judgment make no more serious error than to assume that this selling advantage will continue indefinitely. It is, in fact, in some areas already showing unmistakable signs of petering out.

Michigan Certified Concrete Products, Inc., is one relatively new concern, at least, which hasn't postponed all effort in the selling field until forced to it by necessity. This firm started operations in Grand Rapids, Mich., in December, 1946, and adopted at once a policy of aggressive selling and merchandising which has already paid handsome dividends. At the very start the company adopted the catchy and easily-remembered name Durocrete to identify its products. Regular ads on the building page of the *Grand Rapids Press* play up this name, and also give prominence to the fact that Durocrete is a certified product, laboratory-tested to assure uniform high quality.

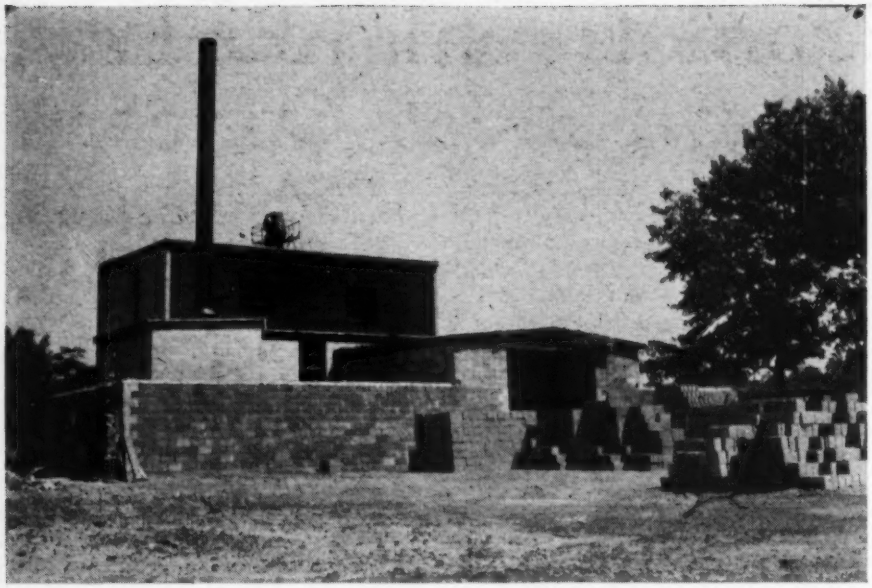
Although convenience alone would have dictated that the plant's productive potential be confined to 8-in. standard units, in order to service its accounts as completely as possible the company right from the start undertook to produce 4's, 8's, 12's, corner units, and sash and half-sash units. The success of this policy was so quickly demonstrated that chimney and bullnose block, lintels and brick were soon added to the line. In this instance the company's convenience was wisely subordinated to the customer's convenience.

In other ways, too, Certified has gone out of its way to make the customer's convenience and satisfaction paramount. Walk-in buyers were given the same courteous treatment which solicited customers received, and little jobs were followed up as carefully and thoroughly as big ones. Perhaps the most important practice adopted was that of on-the-spot inspection of Durocrete installations, coupled with a standing offer to provide engineering service and advice to assure proper use of the product.

Not all of the benefits of policies such as these are tangible, nor are they all immediately apparent. But one very tangible fact stands out in the Durocrete picture: in the year and a half since the business was established the company has had to



• The two block machines at Michigan Certifieds' concrete products plant are set at right angles. One skip hoist serves both feed hoppers.



• A general view of the Michigan Certified Concrete Products plant at Grand Rapids, Mich. The main portion of the building measures 40 by 60 ft., with a height of 32 ft. over the bins.

double the capacity of the plant, increasing it from 3,800 units in 8 hs. to 7,600 units. In the same period a good many established producers have had some trouble marketing their existing production, without worrying about expansion programs of that magnitude.

All of Certified's output is in cinder concrete. The company started purchasing and stockpiling cinders when ground was broken for the plant, and by the time construction was completed there was a 14,000-cu. yd. supply on the yard. The raw cinders, after proper aging and weathering, are fed to a crushing and screening circuit. A 1-cu. yd. Scoopmobile dumps the material through a grizzly into an underground hopper, from which it is elevated and discharged onto a double-deck, 3-by 6-ft. Simplicity vibrating screen. Five-eights inch oversize is returned to a Welch double-roll crusher, which is arranged in closed circuit with the screen, and the final product is separated into two fractions—minus ⅝-in. plus ⅜-in., and ⅜-in. down to dust. These sizes drop from the screen into a 2-compartment overhead bin which has a total capacity of 85 cu. yds.

At the time of delivery bagged cement is loaded directly onto wooden pallets holding 32 sacks each. The pallets are then picked up with a gasoline-powered Lewis-Shepard high-lift fork-truck, and stored inside the plant buildings. The fork-truck is also used to move one pallet at a time, as required, to the mixing platform. Although at the time we visited the plant this handling system gave every appearance of operating efficiently and effectively, the plant owners were planning to replace it with a bulk handling system.

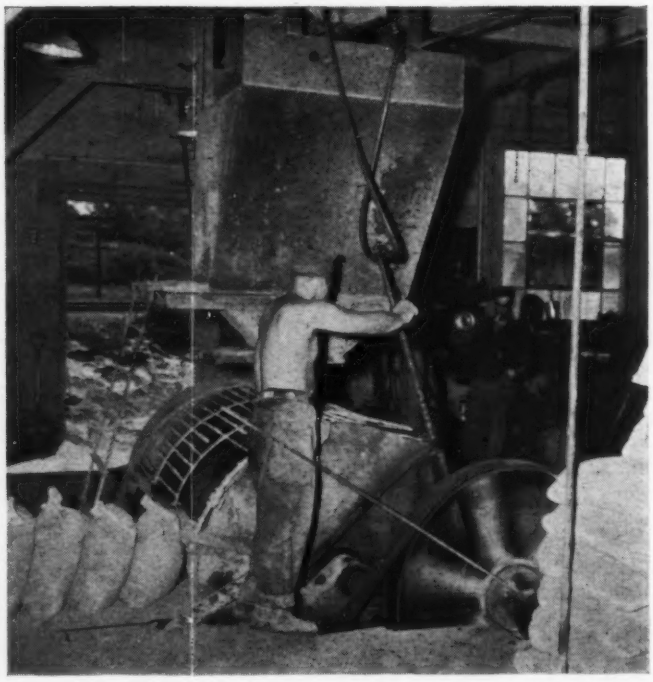
The materials are batched by volume and mixed for about 6 minutes in a Universal 42-cu. ft. paddle-type mixer. Fly ash is used to replace about 25 percent of the portland cement in the mixes. According to the operators this practice has a number of advantages. The concrete is more workable than in straight cement mixes, and the blocks are not only stronger but show a definite improvement in surface texture. It has also been found that the mixer and the block machines can be cleaned more readily.

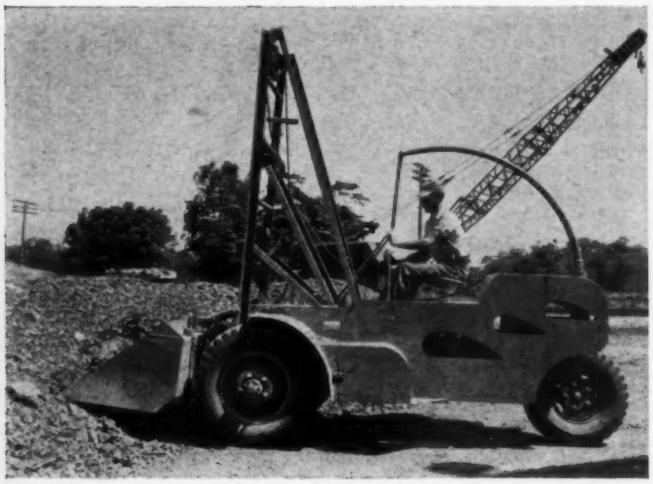
Certified was one of the first companies in the block industry to install the Lith-I-Block machine, made by the Lith-I-Bar Company of Holland, Mich. This machine, an automatic vibrating stripper, produces two standard 8-by 8- by 16-in. units on a plain pallet in each cycle of operation. The major operations, including the pallet feed, are actuated by air-oil cylinders. Only the feed agitator drive and the vibrators are operated electrically. It turns out 8-in. units or equivalent at an average rate of 480 per hour. Two pallets at a time are removed from the delivery conveyor of the machine by means of a pneumatic off-bearer equipped with exceptionally long fingers.

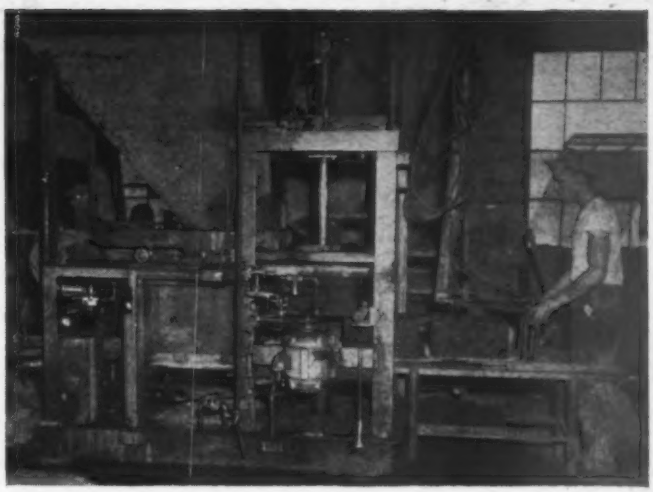
Although Certified began its operations with only one machine, the

• Right: Both power machines are served by this 42-cu. ft. batch mixer. Batching is controlled by volume.

• Below: Cinders are fed from the stockpile to the processing circuit with this 1-cu. yd. power scoop.







design and layout of the plant contemplated the addition of a second machine at some time in the future. Actually, the demand for Durocrete increased so rapidly that the second machine was ordered only a few months after the completion of the plant, and the installation was made less than a year after the opening date. The machines are set at right angles, with the two feed hoppers almost touching, so that they can be supplied by the same skip hoist.

Green blocks are loaded into 10-rack kilns with a Lewis Shephard Type WHF 3,500-lb. hand lift-truck. The kilns are 7 ft. wide by 32 ft. long by 8 ft. high. After an initial setting period of 1½ to 2 hrs. the temperature is brought up to 180 deg. F. in 2½ to 3 hrs. A 60-hp. boiler, fired with a Dutton high pressure oil burner, is used to generate steam. The steam-on interval is followed by a 15-hr. soaking period, after which the kiln doors are opened and the steam cleared out in preparation for unloading operations. Cured blocks are handled with the Lewis Shepard power lift.

About 150,000 units can be stored on the property, which measures 150 ft. in width by 400 ft. in depth. The company operates one 2-ton flat-bed truck of its own for deliveries, but makes extensive use of hired equipment. Deliveries have been made as far as Traverse City (about 150 miles from Grand Rapids), but the bulk of the market lies within a 40-mile radius.

In a very large measure Certified's excellent start in the products field may be attributed to the know-how of its president, Lloyd C. Bender. As a salesman for the Peerless Cement Co., Mr. Bender served the building industry in the Grand Rapids area for 20 years. Associated with him in the block business is Jerome W. Sonefield, who acts as plant manager and as secretary-treasurer of the company.

• Left: A high lift fork-truck is used to handle bagged cement on pallets. Pallets carry 32 sacks of cement.

• Right: A closeup of one of the block machines. Note the absence of anchor bolts, one of the features of this make. Although the machine compacts by vibration, the frame is practically vibrationless.

Case History

(*From page* 204)

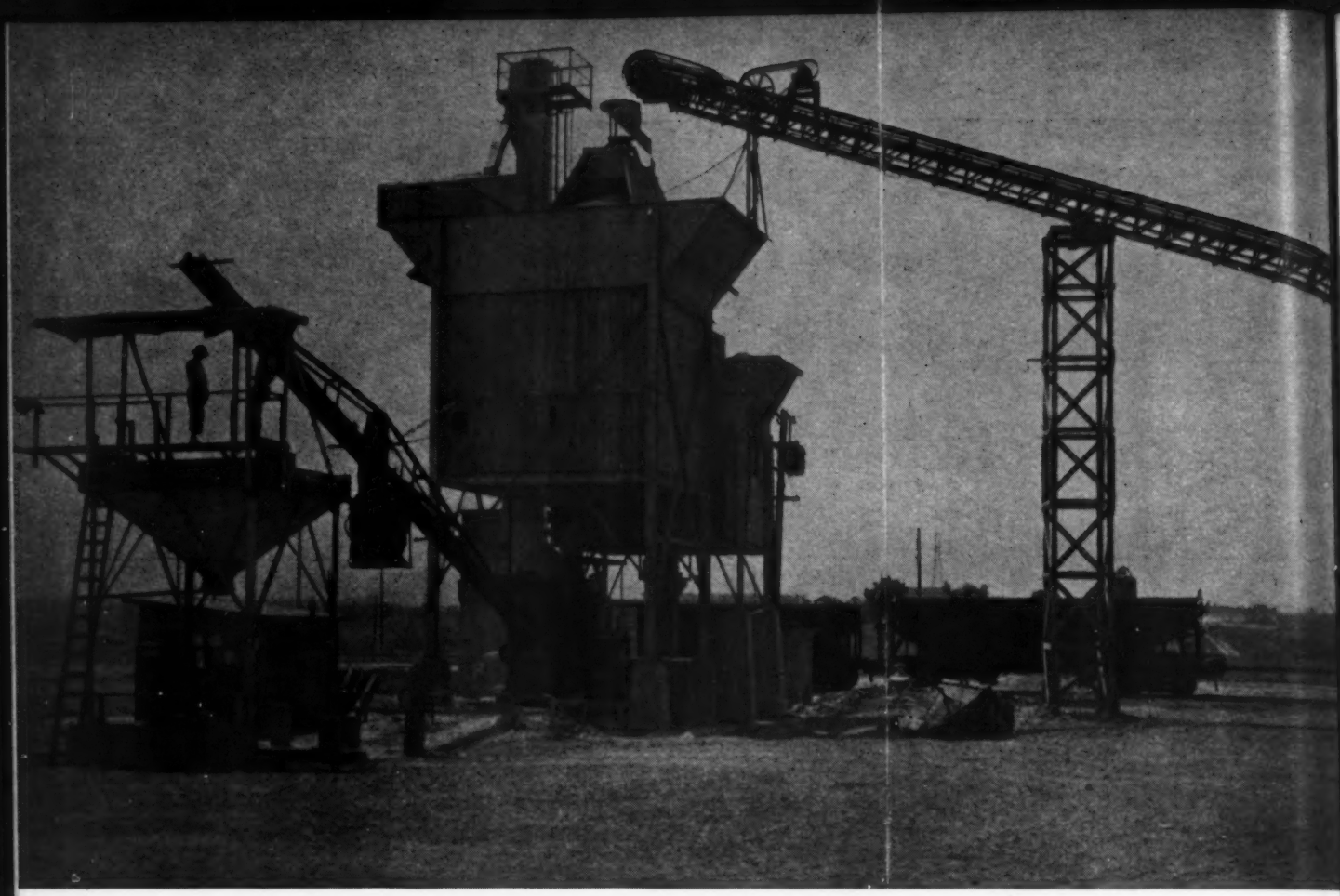
thus relieving an acute shortage that was threatening every form of building construction in the area, the company has protected its own market for block, ready-mixed concrete and other materials.

Seventy-five percent of Albany's block output consists of lightweight Superock units. Sand units account for 20 percent and granite for about 5 percent. About 60,000 units are sold per month—a considerable drop from the 90,000-unit pace set in 1946, but still far exceeding any previous performance in the area. In marketing this output extensive use is made of building material dealers in surrounding towns, who are required to keep only a small supply of units on their yards. For truckload orders Albany delivers directly to the customer, but the local dealer makes the sale and collects the commission. About 20 percent of the output is sold in this manner. Considerable quantities of Superock are also marketed as loose fill in cavity-wall construction for freezing plants.

We noted several interesting and somewhat unusual practices in connection with the block plant operations. In yarding and unloading units all the handling is done with a Stearns Yardhoist, which normally carries a compressor along with it. In this instance, however, the compressor has been removed and installed in a nearby shop building, from which it supplies not only the Yardhoist, but in addition furnishes air for the jets which clean the block machines and for the sprays used to oil pallets. For the latter purpose No. 2 fuel oil and used motor oil are placed in a 200-gallon tank, and compressed air above the fluid forces the mixture to the spray nozzles.

Another interesting practice has to do with the maintenance of electrical equipment. With more than 50 motors operating in various parts of the plant, the company found that its electrical repair bills represented a stiff item of expense. For six dollars a week a local concern offered to provide a regular inspection service designed to locate trouble spots before serious breakdowns developed. The company signed up for the service on a try-out basis and found its repair bills almost immediately reduced by more than 60 percent.

In all its varied operations Albany employs about 55 men. The company owns and operates its own pit and washing plant for the production of concrete sand. Block operations account for 14 men out of the total force when both machines are running, or, for 8 men when just one machine is in use. The company is affiliated with R. H. Wright & Son of Columbus, Ga. R. H. Wright Jr. is president of the concern and J. G. Marbury is vice-president and general manager.



• One of the initial steps taken in building Park Forest was the construction of this modern ready-mixed concrete plant.

A City is Born

By EDWARD BRUNENKANT

Arising out of 2,800 acres only 30 miles south of Chicago's bustling loop is a new super community for 30,000 persons—Park Forest. To provide the quality and the quantity of concrete needed for this job, the Corbetta Construction Co., subcontractors, built a ready-mixed concrete plant which supplies concrete for both the foundations and for an unusual precasting set-up.

another ON THE SPOT report

BY August of this year, the first of some 30,000 persons will have moved into new Park Forest homes. For many of these people, this move will mark the beginning of a new and gracious "way of life"—a dream which practically overnight became reality.

Park Forest is the name of a super community which is being built from scratch on 2800 acres 30 miles south of Chicago. In a recent interview for a national weekly magazine, Philip M. Klutznich, head of The American Community Builders, Inc., summed up the project in these words—"We are trying to create a better life for people. In our view, we will have failed if all we do is create houses."

The new city ultimately will have 3,000 rental units and 5,000 private homes. Space in the rental units will vary from 3½ rooms to 6 rooms, with rents ranging from $72 to $95 per month.

Obviously, successful completion of Park Forest demands careful planning, sound financing (backed by three insurance companies for $27,500,000), and, most important of all, speedy execution of the actual construction. To cope with the multifold problems encountered in building the project, its creators, A. C. B., interested top-notch construction men and firms from all over the country. One of the firms attracted to the job was the Corbetta Construction Co. of Chicago and New York. This firm designed and set up a modern ready-mixed concrete plant and an unusual fabricating system for turning out precast concrete porches and precast basement casements on a mass production basis. The ready-mixed plant is actually two distinct plants under one roof: one to supply air-entrained concrete for the floors and foundations; and a second to provide the high-early concrete for the precast operations. Each plant is independent of the other, although the same conveyor system handles the aggregates for each.

All aggregates (sand, gravel, and pea gravel) are delivered to the plant in gondola cars and unloaded over a Butler 10-cu.-yd. undertrack hopper. A short 24-in. by 34-ft. inclined belt conveyor discharges the aggregates, at right angles, upon the end of the 24-in. by 90-ft. main Atlas conveyor. A turnhead at the top of the main conveyor distributes the aggregates into the proper compartment of the butler bin. Three compartments with total storage space of 212 cu. yds., plus 427 bbl. facilities for storage of the air-entrained cement, are used for the

plant providing concrete for the foundations; and 2 aggregate compartments, plus one high-early cement silo, for the plant providing concrete for the precast operations.

Bulk cement is delivered from Universal Atlas Cement Company's Buffington plant in covered dump trucks. To unload, the trucks back into a covered shed and dump the cement in an open hopper above a 10-in. screw conveyor. The screw conveyor extends beyond the shed, so that bulk cement can be delivered by rail as well as trucks. Bucket elevators discharge into a chute mounted on a swivel, which diverts the cement to the proper bin—one for air-entraining and one for the high-early.

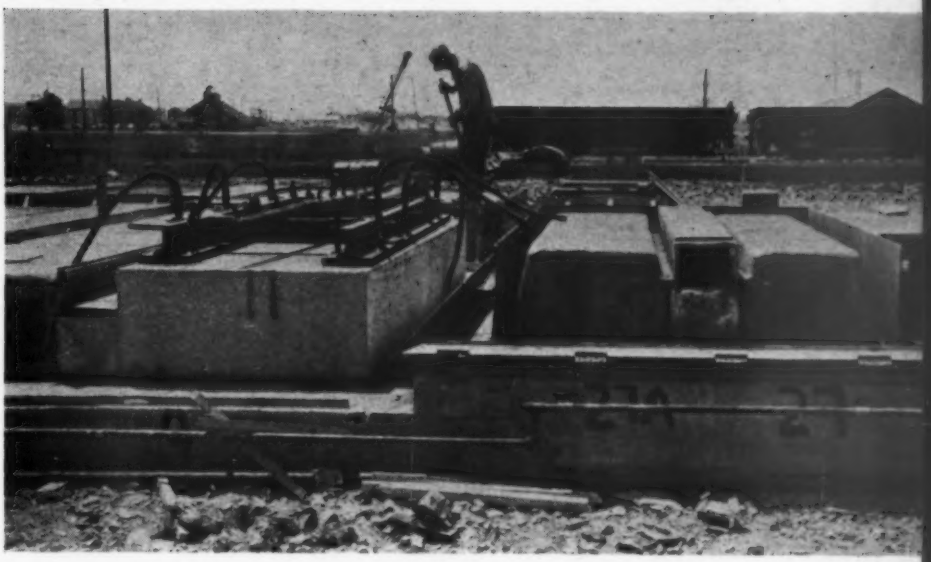
The air-entraining cement, sand, and gravel are proportioned with a 4-beam, 4-cu.-yd. Butler weigh batcher. Water is added by volume and mixing is done in a 34E Multifoot paver. The mixed concrete is discharged into a bucket which runs up a 57 ft. inclined boom and dumps into an open hopper. With the surge capacity, provided by the hopper, concrete can be mixed in 1 ¼ cu. yd. batches and pulled out in 4 cu. yd. (in Dumpcretes) batches.

Concrete for the precasting operations is proportioned with a 3-beam Butler weigh batcher. Mixing is done in a 2-cu.-yd. Smith-Mobile transit mixer.

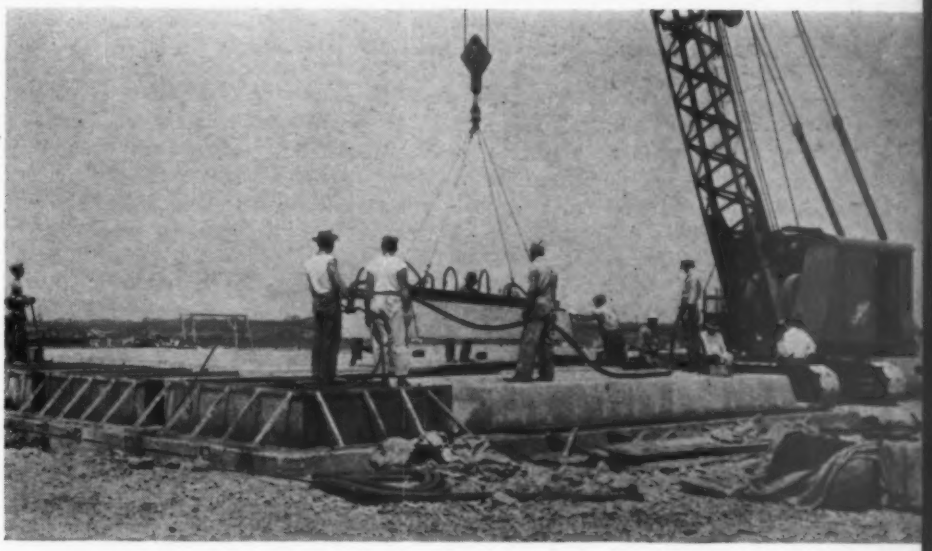
In both systems there was a tendency for the bulk cement to cake inside the chutes directly above the weigh batchers, impeding the batching. This condition was corrected by directing compressed air through a series of blow holes punched in the side of the chute to keep the inside wall of the chute free. The compressed air passes through a dryer which abstracts excess moisture.

Exact control is exercised over all batching operations. R. W. Hunt Corp., (designer of the mixes) keeps a resident inspector on the job at all times, who runs a moisture test every morning, makes the necessary compensations, and once every two hours breaks tests cylinders on a small portable compression machine. The air-entrained concrete develops 3,000 p.s.i. in 7 days and the high-early-strength concrete gives 2,500 p.s.i. in 24 hours and 6,000 p.s.i. in 28 days.

It is extremely important that the concrete used in the precast porches and casements develops a strength of 2,500 lbs. within 24 hours; otherwise the units would break or crack when they were stripped and moved with the vacuum lifter.



• Forms used for casting the porches. Notice the vacuum lifter (left) atop one of the poured units.



• Vacuum lifter, cable-connected to the crane, removes a precast porch slab from the mold.

• Molds for the window casements look like a truncated pyramid. The window frame is laid on top of the mold and cast in place. The seal between the cast unit and the mold is broken by raising the inside form with a powerful screw jack.

• Above. Air entrained concrete is hauled from the ready-mixed plant to the pouring site in 4 yd. dump trucks.

• Left: test cylinders are broken every two hours on this portable compression machine.

Approximately 2,000 porches and 2,500 window casements will be precast in the Corbetta yards. Each porch weighs slightly above 2 tons and measures 5 ft. by 22 ft.

The inside form for the porch is made of concrete with an extremely smooth finish. The outside forms are made of ¼-in. plywood covered with a light gauge metal. These are hinged at the bottom and fold back when the cast unit is to be stripped.

Both forms are thoroughly coated with oil before each pouring. Wire mesh, 4- by 4-in., is cut and bent in the yard and placed around the inside form. A ½-in. reinforcing rod is laid along the deep rib and a ⅜-in. rod in the intermediate rib. Both are tied to the wire mesh. When the outside forms are revolved into place the unit is ready to be poured. After pouring, the concrete is vibrated internally with an electric hand vibrator. Besides compacting the concrete, vibration floats the reinforcing mesh off the inside form.

Seventeen hours after the porch has been poured the unit is ready to be lifted and moved. Moving is accomplished with a vacuum lifter rented from the Vacuum Concrete Corp.

The frame of the vacuum lifter is made of two 6 in. I-beams bolted to a 3-in. plywood bottom. To the plywood is glued a 1-in. layer of sponge rubber through which run three vacuum channels or suction cups. The vacuum can be turned on or off in each channel by means of a simple needle valve located on the lifter.

When the slab is ready to be moved, a 15-ton Manitowoc crane sets the vacuum lifter atop the precast unit and the vacuum valves are opened. The seal between the slab and the mold is broken with a blast of compressed air released through three openings in the inside form.

A mold for a window casement looks very much like a truncated pyramid. In this case, the seal between the mold and the cast unit is broken by raising the inside form, which rests on a powerful screw jack. The finished casements are handled with special grapples which look like oversized ice tongs.

When we inspected this project with Louis Corbetta, secretary-treasurer of Corbetta Construction, we were impressed with the quality of the precast units. Mr. Corbetta told us that the combination of accurately-controlled ready-mixed concrete and his system of fabricating the precast porches and casements would result in better units with appreciable savings in time and money.

Latest Control Methods

(*From page* 206)

Dumpcretes—one 2-cu. yd. and two 3-cu. yd.—on Ford chassis are the latest additions to this fleet. These two types of bodies have been used interchangeably on most jobs and few customers have objected to the use of the dump-type units. According to Mr. Mumford, concrete has been hauled up to 12 miles and kept in the bodies up to 1½ hours in warm weather with no trouble in unloading. Because of their light weight these bodies get in and out of job sites more easily and make more trips. On one job the truckloads of concrete were driven 5 miles to a railroad, loaded on flat cars, and hauled 2 miles to a bridge job on the railroad. Mr. Mumford says that the use of dump-type bodies, like the use of air-entraining cement, is strictly a control problem which can be undertaken by any intelligent producer.

Mr. Mumford, a graduate engineer of long experience, is a member of the American Concrete Institute, has taken the Purdue short course, and has been active in the affairs of the N.R.M.C.A. Last year he held a school for the company's drivers and plant men in which they were taught the fundamentals of concrete mix design, etc. This worked so well that it will probably become an annual practice.

Graham Webb, president of the Middle States Concrete Company and of the Middle States Bituminous Company, both of Ashland, Ky., was recently elected president of the Ashland Board of Trade.

F. W. Long, former head of the firm of F. W. Long & Son, concrete block manufacturers at Jeffersonville, Ind., died recently in that city at the age of 72 years.

Joseph A. Klitch, former operator of the Ideal Concrete Company of North Arlington, N. J., died after a brief illness on March 2.

Ozark Empire Products Manufacturers Hold First Meeting in Springfield

THE first annual convention of the Ozark Empire Concrete Products Manufacturers was held recently at the Colonial Hotel in Springfield, Mo. The organization comprises concrete products manufacturers within a 150 mile radius of Springfield, Mo. There were approximately 80 registered for the meeting, and the program included conducted tours to the various concrete plants in Springfield.

The convention was called to order by President George Rhodius, who introduced the Honorable Harry B. Carr, Mayor of Springfield. Mayor Carr welcomed the group to Springfield and talked briefly on the influence of concrete masonry, the building material supreme, in the growth and development of our cities and farms. Judge Stewart Tatum, Vice President of the Association, responded to the address of welcome. Judge Tatum outlined briefly the purposes and aims of the organization and its responsibilities to the buying public.

The first speaker on the program was George Kulhavy of the Carter-Waters Corporation of Kansas City. His subject was "Light Weight Aggregates and Blocks." He gave high praise to the Portland Cement Association for the splendid help they are giving in making the public conscious of the excellent qualities of lightweight units, such as insulation value, fire resistance, durability, acoustical value and permanency. Mr. Kulhavy stated that the demand for light weight aggregates was far ahead of production, but manufacturers were making efforts to expand and enlarge their plants.

I. C. Crawford, Structural Engineer for the Portland Cement Association, was the next speaker. Mr. Crawford, who is connected with the St. Louis office, chose as his subject "Pre-cast Joists and Other Units." He began by saying that there were three fields for pre-cast construction; first, the base units; second, the structural units; and third, the decorative units. Mr. Crawford stated that the pre-cast field had, up to this time, just been scratched, and he predicted that such items as precast joists, floor slabs, columns, stringers, girders, ribs for silos and bins, telephone and light poles, fence posts, and many other units would in a short time outgrow the block business. He suggested that concrete products manufacturers take due cognizance of this growth and arrange to dovetail these features into their present operations.

• Russel Hennis, I. C. Crawford, A. Carl Weber and George Kulhavy, speakers at the first annual convention of the Ozark Empire Concrete Products Manufacturers.

The third speaker was Russell Hennis, General Sales Manager for the F. C. George Machine Company of Orlando, Fla., who outlined a 5-plank program for the concrete masonry industry.

His observations were outlined step by step. First, to educate the public in regard to concrete masonry construction, he suggested the use of radios, newspapers, billboards and other media. He quoted figures to show that there was a 200 million dollar market for concrete units in the United States in 1947. In the opinion of Mr. Hennis, this amount could be greatly increased with the proper kind of promotion.

Second, Mr. Hennis remarked that there were far too many inferior units being manufactured, and he suggested immediate improvement in the quality of production. This can be done by selecting correctly graded and clean aggregates. Careful consideration should be given to the appearance of the finished product, Mr. Hennis stated. A periodical check while the units are being made will bring big dividends in a finer finished product,

Third, to stress modular co-operation among architects, engineers, and builders.

Fourth, a standard building code should be adopted by the concrete masonry manufacturers and city officials in every city. Building inspectors and other interested parties should be given aid in establishing better and more practical building codes.

Fifth, to assist in promulgating the employment of high class masons by teaching the novices and younger men the fundamentals of the trade. Mr. Hennis stated that the number of good mechanics, unfortunately, was becoming smaller each year.

At the close of the business session of the convention E. George Rhodius of Springfield was reelected president; George Tatum of Joplin

• E. George Rhodius, president; George Tatum, vice-president; Doyle Davis, secretary-treasurer—the officers of the organization.

BARTILE

WORLD'S FINEST CONCRETE ROOFING TILE

PHONE 781

L. E. PUTNAM
MANUFACTURER OF
BARTILE ROOFING
CLEMENTS, CALIFORNIA

April 17th, 1948

E. P. Barber Company
900 West Valley Boulevard
Bloomington, California

Attention: Mr. C. E. Barber

Gentlemen:

Enclosed you will find my order for two more complete Bartile machines and equipment. We have found it necessary to add to our production equipment in order to meet the increasing demand for Bartile Roofing.

It may interest you to know that, within the past year, during the first six months of which we operated with only one machine, our firm showed a net profit of nearly $6,000.00 I consider this a real record, inasmuch as our plant is fourteen miles from a town of any size. The plant was operated entirely with hired help since I have been working in an administrative capacity only.

When our four machines are in operation, we are looking forward to an extremely profitable business during 1948. The ever-increasing demand for Bartile Roofing indicates that our business is going to prosper for years to come.

Thanks for your whole-hearted co-operation in making it possible for us to manufacture Bartile.

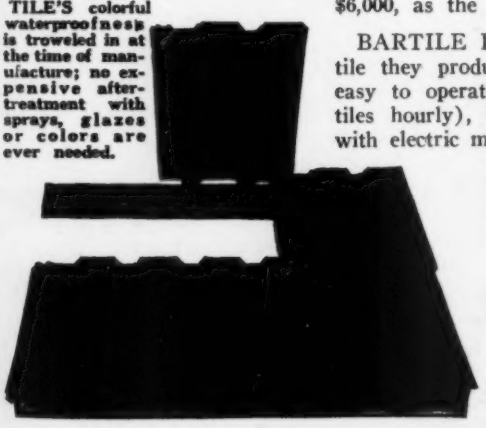
Very truly yours,

L. E. Putnam

Bartile Roofing Tile Machine Earns $6,000 Profit For Mr. L. E. Putnam

BARTILE double tongue-and-groove tile interlocks perfectly . . . lays up rapidly . . . requires no nails. And BARTILE'S colorful waterproofness is troweled in at the time of manufacture; no expensive after-treatment with sprays, glazes or colors are ever needed.

Another enthusiastic BARTILE manufacturer, Mr. L. E. Putnam of Clements, Calif., recently ordered two more BARTILE machines to care for the increased demand for BARTILE roofs. Last year, operating with only one machine for the first six months, he earned a *net profit* of $6,000, as the above unsolicited letter attests.



BARTILE Roofing-Tile Machines—like the tile they produce—are built to last. Sturdy, easy to operate (one man can turn out 100 tiles hourly), BARTILE machines, complete with electric motor and precision-made pallets, are extremely low in cost. Get full details TODAY . . . while exclusive territorial franchises are still available.

E. P. BARBER CO.
900 West Valley Blvd.
Bloomington, California

Ozark Empire Meeting

(*from page* 213)

was elected vice-president; and Doyle Davis of Carthage won re-election as secretary-treasurer.

Following an excellent banquet, A. Carl Weber, Laclede Steel Co., St. Louis, spoke on "The Lost Art of Salesmanship." In his outstanding talk Mr. Weber compared the history of the world from the beginning of time to the present date, to a twenty-four hour trip around the modern clock. On this basis all of our present modern conveniences have been developed during the last minute of the twenty-four hours. Mr. Weber pointed out that there still is a tremendous task before our generation and all generations to follow. W. G. Ruckle of Springfield was toastmaster at the banquet.

J. L. Sotherland has been appointed district sales manager for the Lehigh Portland Cement Company of Allentown, Pa. He will be located at the company's new office in the Union Commerce Building, Euclid and Ninth Streets, Cleveland 14. The firm's Pittsburgh office was recently consolidated with the Cleveland office.

• Violet Maxwell, of Zanesville, O., points to a test cinder block that was subjected to 1800-deg. heat and doused in cold water while red-hot. The block was scorched only slightly, but otherwise not damaged. The experiment emphasized the fire resistance qualities of cinder block, made at the Universal Concrete Pipe Company's plant in Zanesville.

NEW MACHINERY and SUPPLIES

● Side-Saddle Lift-Truck

A new idea in placement of the operator and his controls has been incorporated in the design of the Wagnermobile Duo-Way lift, a heavy-duty lift-truck developed by Mixermobile Manufactures, Portland, Ore. The driver sits crosswise in the machine. Visibility and control of the load are said to be improved, and the operator enjoys greater comfort.

The Wagnermobile Duo-Way lift weights 14,500 pounds and has a rated capacity of 16,000 pounds.

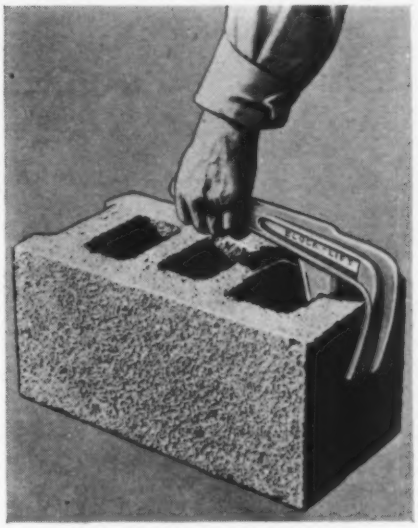
Mounted on a tricycle running gear, the unit is a front-wheel drive, using a Timken L-DPH-100 differential with 900 x 20 dual tires. Hydraulic power steering is adapted to the tail wheel for fast maneuvering. Because the lift-truck operation is approximately equally divided in both directions, the operator is placed crosswise on the machine. From this position, with four operating speeds in either direction, both directions may actually be considered forward.

All controls for operating the machine are conveniently grouped in the operator's position; and all are hydraulic except the carriage hoist control, which is mechanical. Loads are cable-lifted by means of a roller-bearing carriage on the hoisting track. The track is pivot-mounted at its base, to provide for a tilt of 7 degrees forward and 15 degrees to the rear. Constructed in two sections, the top section is hydraulically controlled; and when folded down, the overall height is 9 feet six inches. A fully-enclosed cab is available.

Powered by 114-hp. Chrysler industrial engine, the Wagnermobile Duo-Way lift is capable of operating speeds up to 20 m.p.h. forward and 30 m.p.h. in reverse. Transporting may be done at those speeds; the recommended method, however, is towing with a tow bar behind a 1½- or 2-ton truck. The machine may be safely towed at speeds up to 35 m.p.h.

● Block Lifting Tool

"Block-Lift," a new tool with wide utility in the building field, is now in production at the Block-Lift Co., Mt. Vernon, O. Invented to reduce the work in handling building blocks, Block-Lift



is of sturdy cast aluminum, weighing only 32 ounces. In use the lift acts as a handle. Its open jaws grip either end firmly for lifting, placing, and truing up the block. Its leverage makes handling the heavy blocks a one-hand operation.

● Aluminum Molds

Aluminum molds for various concrete products, some of them quite ornamental, are offered by the Concrete Machinery Company, Hickory, N. C. Items which can be made from these molds include a love seat; decorative flower pots, urns and boxes (eight designs); and bird baths.

The molds are made of heavy cast aluminum and if given proper care are

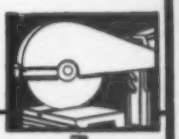
SAVE TIME On Every Job WITH A CLIPPER MASONRY SAW

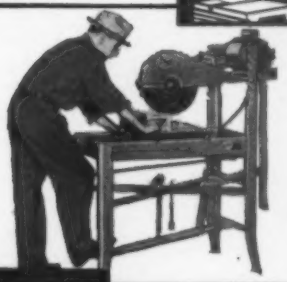
Cuts with
● FIRE BRICK
● BUILDING TILE
● CONCRETE BLOCKS

AMAZING Speed AND Accuracy

● You'll be amazed how quickly and easily you can cut virtually any special length or shape from the hardest masonry materials. Clippers save time — save material, assure better workmanship on every job.

Cuts DRY
Clipper's exclusive design is guaranteed to provide the highest economy with most rapid cutting speed. With or without foot pedal control.





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FAST and FLEXIBLE
The New Model HD-48 Clipper cuts dry just exactly the same as regular Clipper Masonry Saws.. and for Dustless masonry cutting just turn on the circulating system and slice thru the hardest materials. Proven by ten years use throughout the world. Guaranteed to provide the fastest cuts with lowest cost.

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Yes . . . with a Clipper it's easy to slice thru Brick, Tile, Concrete, Glass, Marble, Porcelain or any kind of Refractories . . . Straight cuts, Angles or Mitres. CLIPPERS FOR EVERY JOB — Priced as low as $195. Write for Catalog Today!

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Double and triple savings with standard Towmotor Accessories. However, if a standard Towmotor unit does not solve your handling problem, Towmotor engineers welcome the opportunity to design special equipment to meet your specific needs. Details are available without obligation.

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TOWMOTOR FORK LIFT TRUCKS *and* TRACTORS

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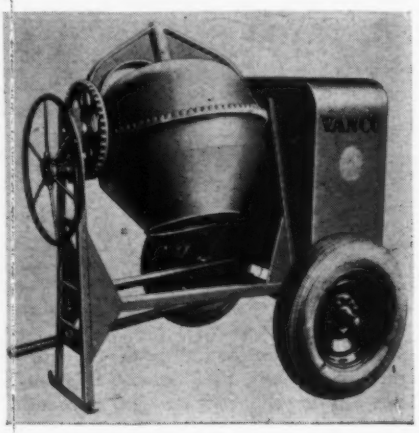
said to be "good for a lifetime."

Concrete Machinery Company also manufactures the Marvel Automatic drain tile maker, described in our April, 1948 number, page 142.

● New Half-Sack Mixer

A new, gasoline engine driven concrete mixer has been introduced by Vanco Products, Inc., as an addition to their line of small utility mixers.

The new model, 35-25VR, is a half-sack mixer with a full load capacity of 3½ cubic ft. Built on a mass production line, the manufacturer plans to market



this machine through dealers to farmers, contractors and builders.

The 35-25VR includes a heavy semi-steel cast bowl and yoke; blades designed for fast, thorough mixing action; and a newly designed tilt gear for mixing and pouring from either side. A heavily reinforced angle frame supports the engine and mixing chamber. It is equipped with a retractable tow-tongue. Engine power is provided by a 3 h.p. air-cooled gasoline engine driving through multiple V-belts. The mixer is mounted on high-speed pneumatic-tired trailer.

The manufacturer has also announced a new shipping policy, whereby full freight is allowed on shipments of mixers anywhere in the United States. Literature can be obtained from Vanco Products, Inc., 130 South Weber Street, Colorado Springs, Colorado.

● Multiple Fork Attachment

The new Equipco "Multiple Fork Attachment" for use with Hyster fork lift trucks is a flexible, rubber-mounted, six-pronged unit which is said to eliminate prong-binding in the handling of concrete block, cinder block, concrete pipe and tile, etc. It is designed for attachment to Hyster Models 40, 75, and is specially built for the 150.

The ends of the six prongs of the new fork attachment extend through a steel bar at the base of the unit and are mounted in rubber. Thus, while maintaining vertical or lifting rigidity, they are horizontally flexible.

The sidewise flexibility of the prongs allows them to be inserted into block or pipe openings without binding, and the multiple prongs permit greater handling efficiency and safety. The new attachment eliminates the need for pallets.

● Anchor Nails

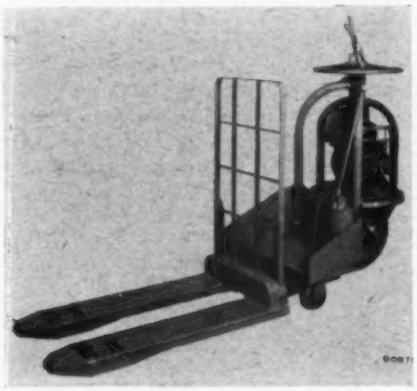
"Gemco" anchor nails, designed for securing plaster grounds to concrete, brick, tile and other wall surfaces, are manufactured by the Goodloe E. Moore Co., Danville, Ill.

Gemco hanger supports and "Tuff-Bond" adhesive are also produced by the company. The adhesive is designed for bonding masonry, hangers, gypsum board, plaster, etc. It is made of a waterproof, reclaimed rubber base.

● Load Dispatcher

The "Load Dispatcher," developed by Schwitzer-Cummins Co., Indianapolis, Ind., is designed for rapid moving of loads from machine to machine, to shipping docks, between departments, and wherever large amounts of material are in process.

It is a simple and easily-operated device, with a single lever controlling op-



eration. At one end of the lever throw the engine is disengaged and the brake set. By moving the lever in the other direction the Load Dispatcher is set in motion. The power unit turns completely around for steering, so that the truck can move in any direction with minimum manipulation. Since there is no transmission, there is no clutch to disengage; gear shifting is also eliminated. Direction from reverse to forward or to the side is changed by turning the steering wheel.

It is claimed the truck requires only four seconds to turn 180-deg. in an aisle no wider than the truck length, or back into a pocket in the opposite direction.

● Colored Sidewalks

Many retail stores are installing colered or black sidewalks, often in decorative patterns. Eye appeal is the basic motive, but there are practical motives too. Dark gray or colored surfaces eliminate glare; fine merchandise in windows is easier to see; ice and snow melt more quickly because of the higher heat absorption of dark surfaces.

The A. C. Horn Co., Inc., of Long Island City 1, N. Y., are the sponsors of this trend. For darkening concrete to be used in black or dark gray sidewalks they make Horn A.E. dispersed carbon black which does not affect air-entrainment necessary in concrete to avoid scaling. For colored sidewalks they manufacture "Colorundum," a dry powder composed of powerful coloring mediums.

THESE FOLDERS SHOULD BE IN *Your Files*

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☐ Concrete Elevators
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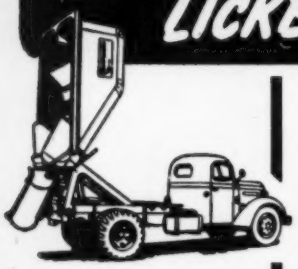
TOUGH MOUNTAIN JOB
LICKED-AT LOW COST!



The Utah Construction Company is hard at work on a power plant tunnel job high in the Sierra Nevada Mountains. The mixing plant is set up at the main concrete pour . . . but two miles away over rough construction roads, is the other end of the tunnel—and another pour.

They picked the Dumpcrete for this tough haul . . . because it is light in weight—fast and easy to handle on the rough roads. It's rugged too—keeps going day after day. It loads fast and dumps fast (right into buckets without a ramp)—four yards of specification concrete every trip. Best of all, it costs less to buy.

These same features make the Dumpcrete a time and money saver for every concrete man. Write today for complete information.

The Dumpcrete Body

Lightweight, watertight, loads fast, dumps fast or slow, places anywhere, costs less to buy and run. Ideal for hauling aggregate, coal and earth.

• • •

*** Dumpcrete Concrete** is central-mix air-entrained concrete hauled and placed with the speedy, low-cost Dumpcrete. Provides top-quality, plastic, workable and non-segregating concrete, saving up to $1.00 per yard.

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MAXON CONSTRUCTION CO., INC.
490 Talbott Bldg., Dayton 2, Ohio

SPEED PRODUCTION — DECREASE INJURIES

Designed by specialists for safety, these thumb-type hand pads offer maximum protection and cool comfort at minimum cost. Heavy genuine horse-hide. Workers like them.

Sample pair — $1.00 — Dozen pairs — $11.40.

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2735 W Huntington St., Philadelphia 32, Pa.

Gloves • Respirators • Goggles • Shields • Aprons • Helmets

• Portable Ready-Mix Plant

A 2-cu. yd. portable compact ready-mix concrete plant, complete in a single unit, designed for on-the-job concrete mixing for construction of bridges, dams and other large building projects is being marketed by C. S. Johnson Company, Koehring subsidiary. As an auxiliary mobile batching unit, it can be used for working outlying territory beyond haul range of the stationary home plant.

The complete unit can be moved close to the job site by rail or on flat-bed trucks. Sections are quickly bolted for erection in the field. All welded main sections, a bin in two main sections, two column end frames, floor beams and cross bracing are prefitted. C. S. Johnson Company, Champaign, Ill.

• 6000-Pound Lift Truck

Now in production by its Industrial Truck Division, Clark Equipment Company, is the Yardlift "60", pneumatic-tired fork truck of 6000-pound capacity. The new heavy-duty machine completes the series of pneumatic-tired machines which includes the Yardlift "40" and the Yardlift "20", of 4000-lb. and 2000-lb. capacities, respectively. These machines are designed specifically for outdoor

handling operations and for smooth movement of unit loads over any rough, uneven, slippery surfaces.

Design and construction of the Yardlift "60" embrace features fully proved in the field by the Yardlift "40" and the Yardlift "20". Among the features cited are: frame of heavy rolled steel, cross braced and welded into an integral unit, proof against distortion; specially designed 6-cylinder, 50-hp. engine; pivoted steering axle mounting—with its three-point suspension; a heavy-duty full-floating driving axle, with extra heavy housing and dual drive wheels; double reduction steering mechanism; and a pneumatic-cushioned adjustable seat with upholstered back-rest. All parts are readily accessible for servicing. Standard lift is 112 inches, with an overall height of 85 inches.

● Metal 4-Way Pallet

A new type all-metal 4-way pallet has been developed by the Palmer-Shile Company, Detroit 27, Mich. It is a four-way, single-face all-steel pallet de-

signed for use with power truck or hand truck. Edges are beveled on two sides to allow trucks to ride over easily. A special rolled channel steel face with center brace is designed for extra weight load.

● Three-Way Truck

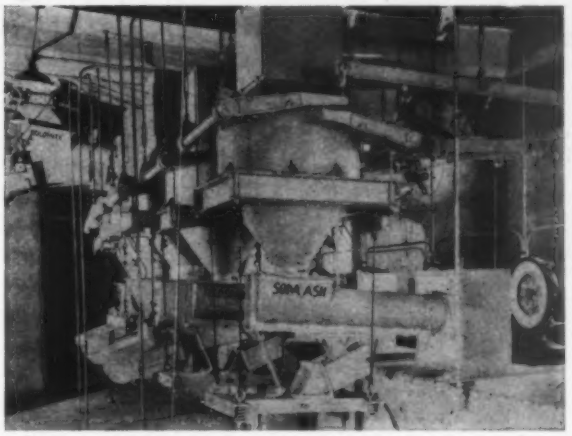
The latest piece of major materials-handling equipment to come from the Market Forge plant is known by the descriptive name, "Load-Mobile." According to the manufacturer, it is streamlined in design, simple to operate and maneuverable under all conditions.

The operator can handle the Load-Mobile in any one of three ways: For short hauls, where the operator must be on and off the truck quickly and conveniently, a folding step is provided; when the operator finds it convenient to

face away from the load, a swivel seat is placed in this position; when he finds it convenient to face the load, when negotiating narrow aisles, passing through narrow doorways with bulky loads, etc., he may easily change the seat position.

Two speeds are furnished, controlled by a foot pedal. The instant the operator removes his foot from the pedal, the brake goes on.

The unit is available in two models; No. 3000 and No. 5000, both with 20 percent guaranteed overload capacity. The speed of the 3000 model will average approximately 3.5 m.p.h. and the 5000 model 3 m.p.h., taking into consideration the full-load speed and no-load speed for a complete cycle of handling. The unit will be available in 36- to 72-in. length of platform. All units will be 26 in. wide and the heights will be the standard lift truck heights.



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Provides ACCURACY OF BATCH

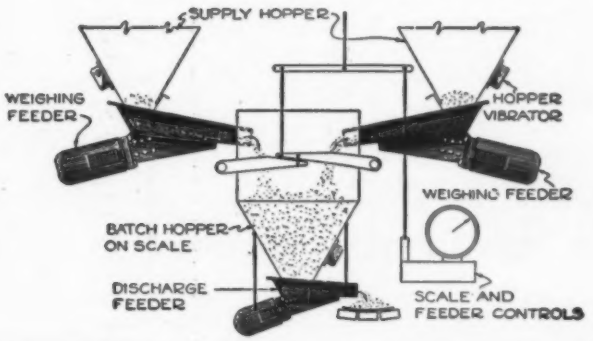
SIMPLE CONTROL

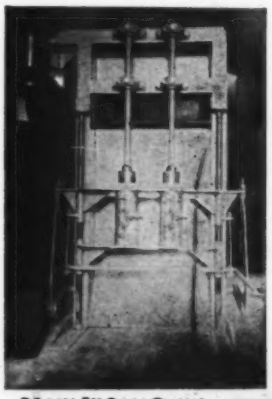
SELECTIVITY

SYNTRON Vibratory Feeders inter-locked with scale control permit the handling of any one, or a combination of any materials to be accurately and automatically batched at the same time.

What is your problem? Write us about it.

SYNTRON CO., 385 Carson, Homer City, Pa.





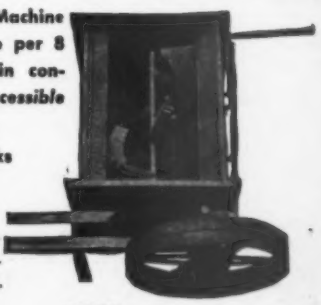
DRAIN TILE MACHINE

Write for Complete Information

HIGH PRODUCTION—LOW INVESTMENT

The Wooten Drain Tile Machine produces 2000 to 3000 tile per 8 hour shift. It is *rugged* in construction and *simple* and *accessible* in design. Price $685.00.

Delivery 2 to 5 Weeks



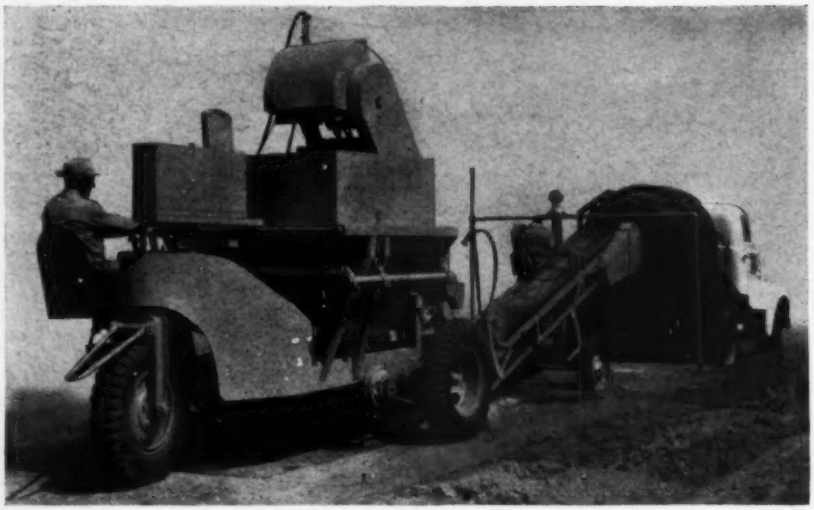
MIXER

WOOTEN MIXERS

Sturdily Built In Any Size to Meet Your Production Requirements. 9 Cu. Ft. Mixer $375.

C. M. WOOTEN CO. • 2717 Central Ave. Knoxville, Tennessee

WILLARD Puts You in the Ready-Mix Business for Less Than Usual Bin Cost



Three WILLARD units, (1) self-powered loading weigh-batcher, (2) conveyor-loader, and (3) a WILLARD transit mixer (either 2 or 3 cu. yd.) put you in the ready-mixed concrete business at rock-bottom cost. A "natural" for small aggregates producers . . . sand and gravel in ground storage is self-loaded and accurately weighed in the portable weigh-batcher, cement is added, and the batch promptly charged into the mixer. Scores of WILLARD plants now operating . . . why don't YOU get the facts . . . TODAY!

WILLARD CONCRETE MACHINERY CO., LTD.
2906 Imperial Hwy. **Lynwood, Calif.**
DEALERS: Some Exclusive Territories Still Available

● Truck-Man Pallet Toter

A pallet-handling type of truck, the "Truck-Man Pallet Toter," has been added to the line of gasoline-powered materials-handling equipment produced

by Truck-Man, Inc., of Jackson, Mich., and will be designated as Truck-Man Model "DF".

A feature of the Pallet Toter is the ratio of truck weight (920 lbs.) to payload capacity, conservatively rated at 3000 pounds capacity. This will make possible new standards of economy in operation, the manufacturers say. The unit is designed around Truck-Man's pneumatic-tired power turret, a feature which provides turning within its own length. The truck is gasoline powered by the "AB" 3-hp. Wisconsin engine, and as with other Truck-Man equipment, the operator rides with the load. Rubber insert load wheels have been designed to soften the jolts on rough plant floors.

Is your cement storage bin 100 feet or more from the siding? Are there any obstructions between storage and siding regardless of distance to make mechanical handling impractical?

Look into the merits of the Robinson Air-Activated Conveyor. With it, you can get shipments in hopper bottom cars; unload each car in two hours or so; and operate season after season without heavy maintenance. Pipes do not clog because the cement does not encrust. There are no continuously moving parts, screw feeds, bearings, etc., that so frequently cause shut-downs and maintenance.

If you wish to save in costs for handling your bulk cement, investigate the Robinson System. Write to us.

ROBINSON *Air-Activated* **CONVEYOR SYSTEMS**
Division of **MORSE BOULGER DESTRUCTOR CO.**
Representatives in Principal Cities
211-G EAST 42nd STREET • NEW YORK 17, N. Y.

Eliminate Competition by Switching to MORTARLESS

PATENTED

GET THE FACTS TODAY!

***Mortarless Interlocking* Concrete Block machinery is sold only on a protected territory basis—you are the *only* producer of these patented units in your area. Mortarless units interlock, lay up perfectly, are strong and durable, require no mortar, can be erected with unskilled labor. Approved by building codes, even in Florida and California where hurricanes and earthquakes occur. For details, write:**

Mortarless Tile & Machine Co.
2623 Riverside Drive, Los Angeles 26, Cal.

● Transit Mixer

A new 3-cu. yd. transit mixer with several unusual features has been announced by the Willard Concrete Machinery Co., Ltd., Lynwood, Calif. Retaining many of the features which have made the Willard 2-cu. yd. mixer so puplar, the new unit is extremely maneuverable and can drive into tight places impossible to reach with the usual 3-cu. yd. job.

The drum assembly weighs but 2,930 lbs., (over 1,000 lbs. lighter than any other truck mixer of similar capacity) enabling it to carry a big payload without danger of breaking sidewalks, drives, etc. The 50-percent gain in capacity was accomplished by increasing the drum diameter without increasing its length, permitting the unit to be mounted on the popular 2-ton, 110-in.-wheelbase c.o.e. tractor-type trucks. No separate drive motor is required, the drum turning by power take-off using energy from the truck motor. Made of toughest steels, the mixer can be controlled from either the rear end or the cab.

Improvements have also been made in the Willard portable self-loading weigh-batcher; it is now available also in both 2- and 3-cu. yd. models. The conveyor loader has been redesigned to put the mix into the drum at the correct speed and angle for clean, rapid charging.

Many dealers are now displaying and demonstrating this equipment.

truck-man

BUILT TO DO BLOCK JOBS BETTER

ASK ANY OPERATOR

$775

f.o.b. factory

TRUCK-MAN'S BLOCK MACHINERY SPECIALISTS

Anchor Concrete Mach. Co. Columbus, Ohio
A. N. Olsen Rock Rapids, Iowa
Blatt Sales Co. Tampa, Fla.
Clark-Wilcox Co. Boston, Mass.
Concrete Block Plant Equip. Co., Birmingham, Ala.
Concrete Transport Mixer Co. St. Louis, Mo.
Contractors Mach. & Equip. Co., Hamilton, Ont., Canada
C. H. Jones Equip. Co. Salt Lake City, Utah
C. J. Rahn Co. Newark, N. J.
E. B. Kelly, Inc. Farmingdale, L. I., N. Y.
Kent Machine Co. Cuyahoga Falls, Ohio
Fleming Mfg. Co. St. Louis, Mo.
F. C. George Machine Co. Orlando, Fla.
Lith-I-Bar Co. Holland, Mich.
Llewellyn Mach. Corp. Miami, Fla.
R. S. Reed Corp. Three Rivers, Mich.
Sterns-Oakes Sales Co. Adrian, Mich.
Siano & Sons Greenfield, Mass.

Yes, for SAFER, FASTER, BETTER handling of concrete blocks—Truck-Man has what block manufacturers demand:

- Ample capacity—many carry over 60 blocks.
- Easy lift and drop, soft start and stop—handles green blocks gently.
- Hydraulic lift and gasoline power—ease and speed handling.
- Cat-like maneuverability possible only with 360° steering.
- Easy on-and-off, simple and safe operation by unskilled drivers.
- Low first cost, low operating cost, low maintenance cost.

Ask the Truck-Man dealer in your territory about performance, service and economy, or write us for catalog.

a product of

truck-man INC.

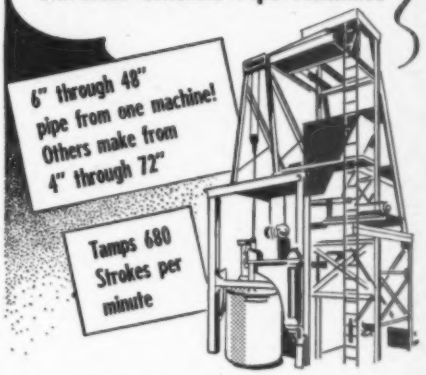
1422 West Ganson, Jackson, Mich.

Universal

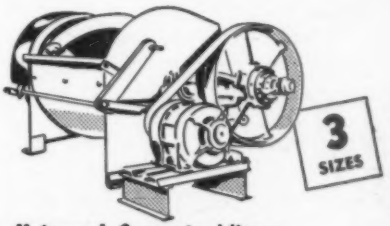
Pipe-Making Machinery is Designed for *high profit* Operation

fewer men make more pipe with

Universal Concrete Pipe Machines

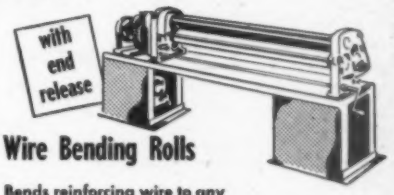


Real money-makers because they make finest ASTM Specification pipe at lowest cost of operation and maintenance. Designed and built by experts with a quarter century pipe making experience. Write for full details.



Universal Concrete Mixers

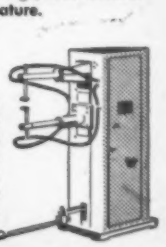
Work horses for manufacturers of concrete products. Simple, dependable over years of continuous operation. Save on first cost and upkeep. Capacities: 28, 42 and 50 cu. ft. Send for information.



Wire Bending Rolls

Bends reinforcing wire to any radius, accurately, quickly. Quick, easy removal of completed cages. Extra heavy frame and oversize bearings, with covered gears and overload safety feature.

Wire Mesh Welder



Specially designed for welding reinforcing wire (but adapts for many other uses). Best there is for steady heavy-duty service. Fully enclosed in steel. Water-cooled electrodes. Heat control switch. Swivel foot pedal leaves both hands free.

Write Today for details, prices

UNIVERSAL CONCRETE MACHINERY CO.

297 South High Street Columbus, Ohio

DRY WALLS

Interior or Exterior
Above or Below Grade

Eliminate costly guess work in solving wet wall problems. Seal and beautify porous walls of concrete block, tile, stucco, etc., with Spray-O-Bond Concrete Sealer. It's easy to apply — almost like brushing on paint. Used successfully by contractors for over 20 years. A post card will bring you the name of your nearest dealer.

SPRAY-O-BOND COMPANY
2225 N. Humboldt
Milwaukee 12, Wis.

spray-O-bond

Trade Notes

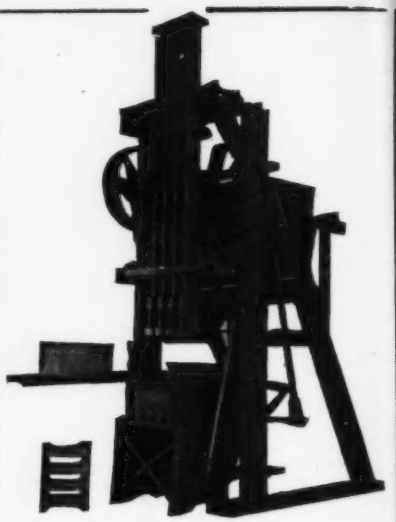
C. R. Gifford

The Kent Machine Company of Cuyahoga Falls, O., announces the appointment of C. R. Gifford as Eastern sales representative to handle their line of concrete products machinery.

A Britisher by birth, Mr. Gifford attended the London Engineering College prior to his arrival in the U. S. A. in 1923. His experience covers the design, manufacture and sales of concrete and building products machinery.

As a former owner and operator of a large block plant, he comes to Kent with a broad background of practical experience.

The Jaeger Machine Company, Columbus, Ohio, manufacturer of construction, paving and industrial machinery, has announced the relocation of its Eastern regional offices. Formerly at 8 East 48th Street, New York, the offices are now established at 1504 Widener Building, Philadelphia.



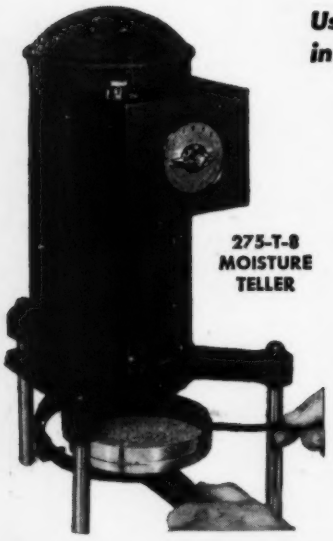
An All-Purpose Machine

The Junior Stripper will turn out more blocks per man than any other hand-operated machine on the market . . . 200 per hour being easily maintained! Nor has quality of output been sacrificed for the sake of speed. Units are uniformly dense, true to shape, of uniform texture.

Stearns Clipper Stripper Machines; Stearns Joltcrete Machines; Stearns Mixers; Cast iron and press steel pallets. Straublox oscillating attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager **Columbus, Ohio**

FLASH-DRY SAMPLES . . . . . TO DETERMINE MOISTURE CONTENT

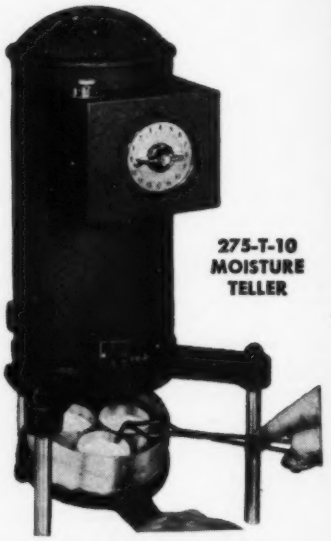


275-T-8 MOISTURE TELLER

Use* MOISTURE TELLER *for plant moisture control in processing or for laboratory moisture determinations

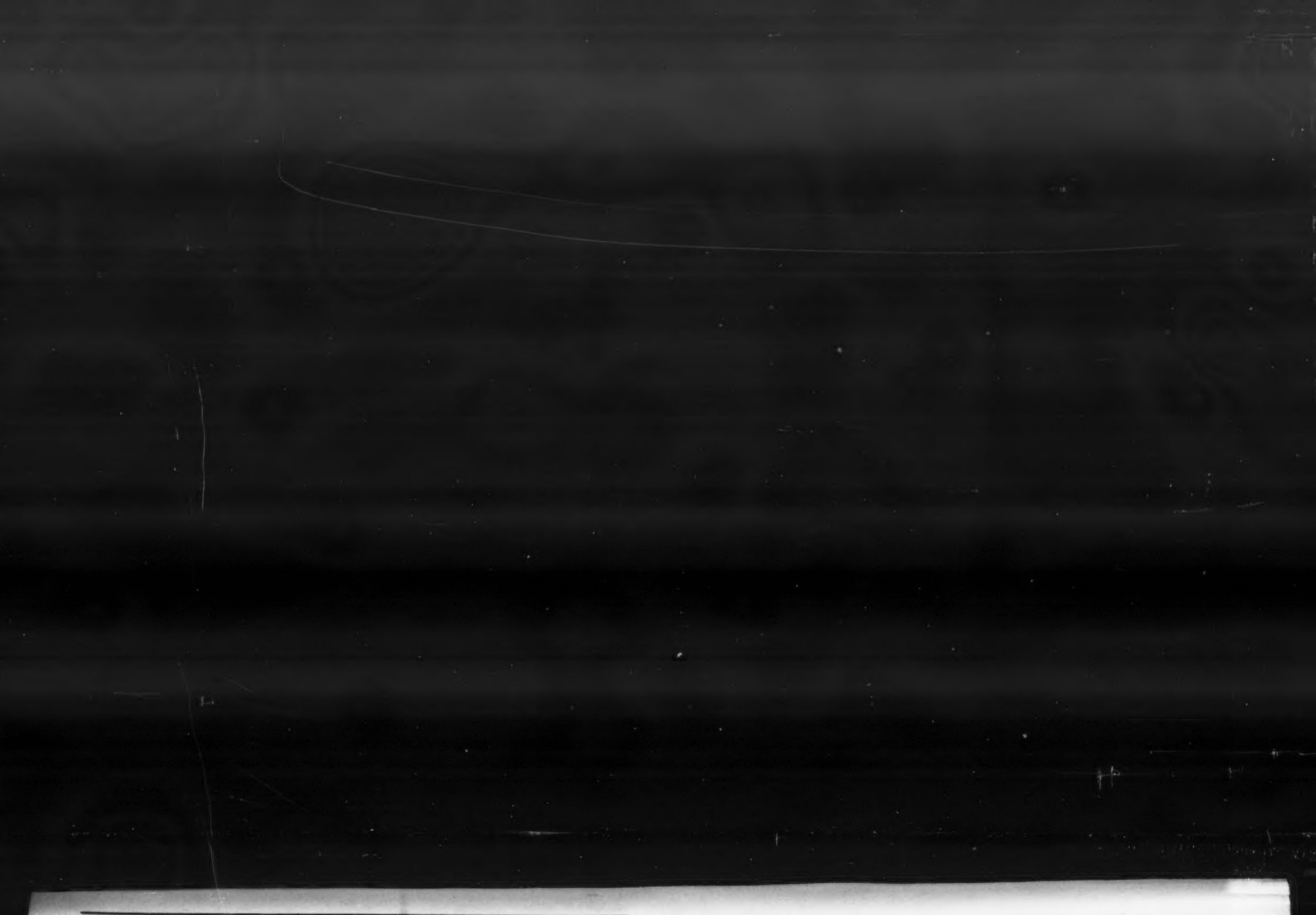
ACCURATE • SIMPLE • FAST — The Moisture Teller determines the moisture content of granular, fibrous, crystalline or liquid samples quickly and safely and without the need for involved mathematics. Just place the sample in the drying pan and place in Moisture Teller. In a few minutes it will be completely dry. The loss in weight on rider scale of balance is read as moisture percentage. Drying pans can be furnished in sizes from 5¼″ to 8″ in diameter and from 1″ to 12″ deep. Liquid samples are dried in glass or aluminum pans.

Write for specifications and prices to Dept. M-2



275-T-10 MOISTURE TELLER

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND • MOLD • MOISTURE • SULFUR • CARBON